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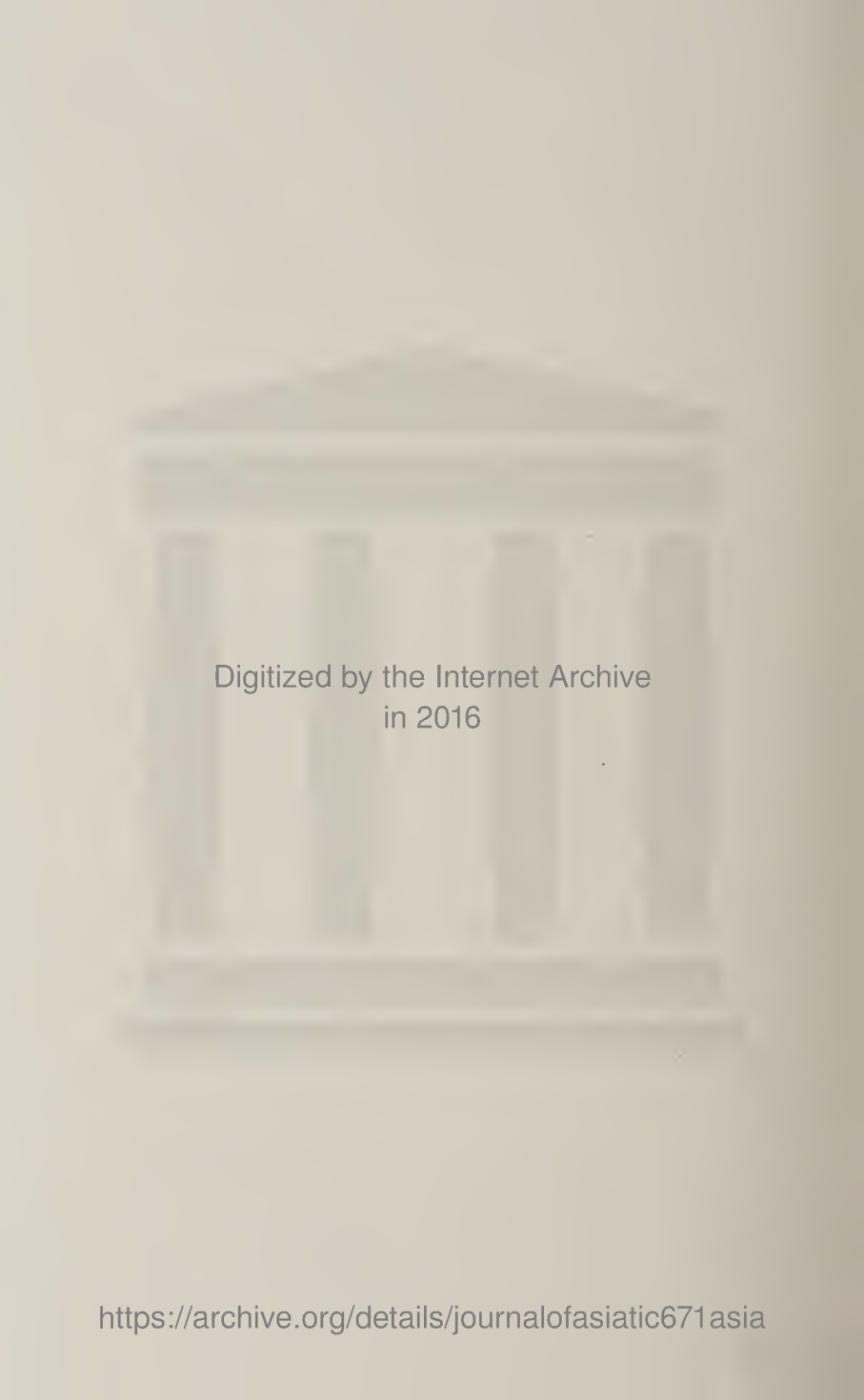
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No. 71.—November, 1837.

I.—*Journal of a Trip to the Burenda Pass in* 1836. *By Lieut.* THOMAS HUTTON, 37*th Regiment, Native Infantry.*

On the 22nd of September, 1836, I started from *Simla*, which averages an elevation of 7,200 feet above sea level, in company with a small party of friends, on a trip to the *Burenda Pass*, with the intention of crossing into *Kanáwar*. The road from *Simla* to the top of *Mahássú*, is a pretty steep ascent for nearly the whole way, but the scenery, particularly in the forest, is very beautiful and reminds one much of the grounds around a gentleman's country seat at home.

Several species of pines and thorny-leafed oaks, intermixed with large plane trees and various others, compose the forest. Black currant bushes and raspberries, both yellow and red, are plentiful, as also the blackberry or bramble. The fruit of the former is much sought after by the residents at *Simla*, to make preserves with: wild strawberries are also abundant and richly flavoured.

Flowers*[1] of various kinds are scattered over the more open parts of the forest, and flitting over them may be seen numerous butterflies, many of which are common to Britain and continental *Europe*. Among others I recognised and captured the beautiful 'swallow-tail'd'[2] and 'tortoise-shell' butterflies[2];—the caterpillar of the latter, being the same as that of Europe, and like it feeding on the nettle.

The 'painted lady'[2] is also abundant, as well as the large[2] and small 'cabbage butterflies[2].' 'The black-veined white'[2] is among the most numerous, and many of the beautiful little species belonging to the Genus *Polyommatus*.

* See notes at the end.

Here also beneath the decaying trunk of fallen trees I discovered in abundance some new species of land snails[4] belonging to the genera, *nanina*, and *bulimus*.

Pheasants are plentiful down the *khads*, but it is hard work hunting for them.

The *plass* or *pucras* pheasant[5] and another bird called, the *khalij*[5] pheasant, are the commonest, but the *monál*[5] is to be met with towards the latter end of autumn and during the winter season, as also the woodcock[5]; indeed one of the latter birds, I saw flushed in the month of August, and a brace were seen at *Simla* this year in November.

Wild hogs are abundant in the deep glens, where they shelter themselves all day, and at night sally forth to regale on the grain fields, much to the annoyance of the farmers;—they also visit the higher and more open parts of the forest where they turn up the ground in search of aromatic roots, &c.

Bears*, too, are numerous in the rocky glens, arriving from the colder parts of the hills in the autumn and staying during the winter, —retiring again to the interior about April, as the weather becomes hotter.

Besides these, many other animals are inhabitants of this forest, such as the leopard[6], leopard cat[6], the hill fox[6], and troops of lungoors[6], as also the musk deer[6] and flying squirrel[6].

The former animal is seldom seen except at night when it prowls about the sheep-folds, and is often as much the terror and pest of the poor highland villagers, as the more formidable tiger is to the inhabitants of the plains.

At *Simla* where the leopard is by no means scarce, it is necessary at nightfall to shut up the dogs, or they would, invariably sooner or later, as indeed numbers do, fall victims to the voracity of this prowling savage. Even in open day, dogs are frequently snatched up by this animal, when hunting along the wooded banks, only a few yards from their masters. Instances are even on record of their entering houses at night when the doors have been incautiously left open.

Large tracts of the forest of the *Mahássú* have of late years been cleared for the purpose of planting potatoes, which thrive well on sloping grounds and are cultivated to a great extent, vast quantities being annually sent to the plains for sale.

The magnificent timber which once abounded here is fast falling beneath the woodman's axe, and it is to be feared that ere long, the

* Ursus Thibetanus.

so much vaunted beauty of this forest, will have passed away. The demand for good timber, for the purposes of building, since *Simla* became a resort for invalids, has been so great, that the needy and money-loving Ránas, have turned the gigantic beauties of the forest, to account, and many places are beginning to look quite bare and naked from the constant drain upon them.

It is more than probable, if this destruction continues, that in a few years the forest will be ruined; for it is a curious and melancholy fact, that but very few young trees are springing up to supply the places of the parent stock.

Many fine trees are also destroyed by the practice of setting fire to the jangal grass, for the turpentine which exudes so plentifully from the pine trees, immediately takes fire and the bark of the tree is destroyed at the base. The consequence is that rain finds a lodgment and rots the outer wood, which having become soft is immediately discovered and attacked by insects, and the tree in a short time withers and falls. Hundreds of these trees as also many fine oaks are to be seen in every stage of disease, both standing and fallen, and almost all arising in the first instance from the fire having injured or destroyed the bark around the base.

In this stage, stage-beetles[2], capricorn beetles[3] and also the click beetles[4] whose larvæ are nourished in decaying trees, are all busy in completing what the fire has commenced, and even a species of snail[4] contributes much to the ultimate ruin of the sturdy oak by boring into every hole and crevice and reducing the fibre of the wood to the consistency of moist sawdust.

It is upon such trees that the woodpeckers, in search of insects within, bore innumerable holes, and although they are labouring with the laudable intent of destroying the hidden foe, yet they also in no small degree hasten the decay of the wood, by boring so many fresh inlets for the rain and snow.

It must be remembered however, that these much abused birds never attack a sound and healthy tree, and their share in the destruction of a decaying one, may be forgiven, on the certainty of its being destroyed even without their aid, by the insects already within it.

The highest peak of *Mahássú* is 9140 feet above the level of the sea; but the *Devi* temple, past which the road runs, is only 9078 feet, after which the road gradually descends for about two miles through the forest to *Fágú*, where there is a small bungalow of one

room, belonging to government, and which is the usual halting-place for travellers, being about twelve miles from *Simta*.

The elevation of the bungalow is 8040 feet.

From this place a road branches off through the *Jubal* country towards the *Chor* mountain, which is one of the lions usually visited by travellers, and attains an elevation of 12,149 feet. The road across the hills to *Masúrí* also lies in the same direction.

At *Fágú* we halted one day and on the 24th September pursued our march towards *Mattiána*, which is the second stage from *Simla* to the cantonment of *Kotgarh*, and where there is another small bungalow of one room. Elevation 8070 feet.

The grassy hills between *Fágú* and *Mattiána* produce during the rains, immense quantities of a species of *orchis*, called by the natives "*salep misrí*," the roots of which are sometimes collected and dried, and afterwards brought to *Simla* or sent to the plains for sale. If care and culture were bestowed upon these plants and the drying of the roots properly attended to, why might not the hill plant equal the famous Persian and Turkish *salep misrí*, which is now sold at such high prices as almost to preclude the possibility of using it? The hill plant grows at *Simla* and is pretty generally diffused over the interior, and as it may be had in almost any quantities, an important and nourishing addition to the diet of infants and invalids might be furnished at a reasonable and even cheap rate.

The road from *Fágú* is seen for miles running along the side of a bare hill, which on one side shuts out the view, while on the other are deep glens with here and there a few houses. It is a long and dreary march of about 14 miles, and as the party I was with were keen sportsmen, we agreed to breakfast at a wood about half-way, and three miles beyond the old fort of *Theog*, which stands on an eminence near the road and is 8013 feet above the sea.

After breakfast we beat the forest for game and found a musk deer and some plass pheasants, as also the hill partridge and the shikárí of the party brought in some *chicórs*[5].

The whole of this day we walked on leisurely down the *khads* for the two-fold purpose of finding game and avoiding the dreary road to *Mattiána*. In the evening we came to our encamping ground in the bed of the glen below *Mattiána* bungalow, on the banks of a stream, which wound along among the bluff rocks and thickly wooded hills, giving a beautiful and romantic appearance to the scene which is here highly picturesque, the banks of the glen rising some hundreds of feet high on either side, and clothed to the top with trees and brushwood.

Here we found that beautiful little flower, *parochetus communis*, figured in Royle's Illustrations. It was growing in profusion among the damp rocks and caves on the banks of the stream. I have since found that it is common also at *Simla*.

In the morning just before daybreak on the 25th we heard the hill blackbirds singing very sweetly from the woods above us. The song is not unlike that of the European blackbird. These beautiful birds commence singing about the middle of autumn and continue their songs throughout the winter and spring, after which they betake themselves to the interior, being autumnal and winter visitants rather than constant residents of the lower hills, although a few may be occasionally met with throughout the year. In the winter season they are found as low down as the vale of *Pinjore*.

At daybreak on the 26th September we ascended a very steep hill towards *Nágkunda*, breakfasting about half-way, by the side of a hill stream and then continuing our journey. On this road are plenty of chicores and a few were shot by the party.

At *Nágkunda* we found two gentlemen from *Simla* who had come thus far to see the beauties of the interior before leaving India for home. In consequence of this rencontre we halted a day and beat the wood for game. Some plass and *khalij* pheasants were killed, and a male musk deer was brought in by one of the shikárí.

The bungalow at this place is larger than those of *Fágú* and *Mattiána*, possessing one large and two small rooms, which afford very comfortable accommodation to travellers. The elevation is 9016 feet.

The scenery from this place is very beautiful.

The cantonment of *Kotgarh* is seen in a slope in the distance, and is much lower than *Nágkunda*, and surrounded by mountains of every shade, from the deepest forest green, to the bare and barren rock, while the long line of eternal snows towers far above them all in the back ground. In the *khads* below the bungalow we found several nut trees with fruit on them, and very similar to filberts in appearance, but all were rotten, and judging from the number of nuts strewed upon the ground, all of which were likewise rotten and were the fruit of the preceding year, I should be inclined to think that few ever ripened. Dr. Gerard mentions having found them rotten in 1818.

The nut tree here grows to a good size, and unlike the hazel bushes of Europe, is really a large tree, springing up some height before the branches spread out, and the trunks of many exceeding a man's body in girth. The tallest trees must have been from 30 to 40 feet high at least.

Flowers of different kinds are here abundant, every open space or grassy hill being studded with various colors; the *anemone discolor*, *parnassia nubicola*, and *potentilla pteropoda* of Royle are innumerable, while in the deep glens or *khads*, growing in damp vegetable moulds, a beautiful white species of *cypripedium* is found, as also a very large white lily, which grows to a height of 6 or 7 feet.

Here also we found a fruit resembling a wild quince, but growing on large trees, with leaves very similar to those of the nut trees.

Another fruit was brought us, which in taste was something like the sloe, the stone somewhat resembling that of the little wild cherry of Britain. The tree is tall and at first sight resembles the cherry tree, but the fruit grows on the stalks in a different manner, being placed at unequal distances up a long straight stem. The hill people call the tree *jummoo*, *(jamú.)*

These forests are also well stocked with splendid yew trees and pines of enormous growth. The birch is said by travellers to grow here also, but we were not fortunate enough to see any.

On the afternoon of this day a shower of rain fell and the wind was very cold; the snow evidently falling fast over the snowy range which was very white. The sky black and threatening.

On the 27th after breakfast we started from *Nágkunda* and crossed the top of *Hattú* or *Whartú*, a steep hill in the neighbourhood about 10,656 feet high. From the top of this mountain a splendid view opens upon the traveller, and some of the houses at *Simla* are seen, while the snowy range, in its vast extent is laid open. Here I took some fine specimens of snails of the genera *nanina* and *bulimus*, among the loose stones and ruins of the old *Gurkha* forts which crest this mountain. The shells of the former genus, far exceed in size, those of the warmer hills of *Mahássú*. Here, also, on the very top of the ruins, I found a solitary plant of *mulgedium manorhizum* in flower, its roots firmly wedged in between the massive stones.

There are a few stone huts on the top of this hill erected by an officer, as a temporary shooting box. After resting awhile and enjoying the fine view, we went down the opposite side of the mountain and a few miles farther on brought us to our encamping ground at a place called *Bagie* beneath a hill crowned with the ruins of an old fort of that name, and a short distance above a village called *Shail.*

From this village excellent coolies are procurable and we got all necessary supplies very easily, the villagers coming into camp with grain, ghee and milk.

Part of the road after leaving *Hattú*, lay through a wood and was frequently interrupted by fallen timber. In the open parts among

beautiful flowers of different kinds and colors, gave a very pleasing effect to the scene. At one part of the road, an otherwise bare rock, was bedecked with numerous plants of *mulgedium manorhizum* of Royle, while in the first I gathered the golden flowers of "*corvisartia indica*."

Here again European forms of butterflies presented themselves, sporting among the flowers of the forest. The 'large tortoise-shell'[2] and 'brimstone butterflies,'[2] were recognized, as also the 'marbled white'[2] and two others which appear to be but varieties of the European insects *argynnis aglaia* and *vanessa atalanta*.

Many others peculiar to these hills were also noticed.

Not finding ground to ride over during the latter part of this march some of the party sent back their ponies.

The distance travelled this day was about 12 miles, of which the first five or six were very steep. The elevation of *Bagie* is 9084 feet; the village from which our supplies came is 7400 feet.

Early on the morning of the 28th September we resumed our march and found the whole way beautifully varied with flowers, chiefly of a species resembling a blue China aster. The road or rather track, lay sometimes through deep and shady woods, every now and then opening out upon grassy hills, at other times leading up over rugged rocks resembling steps, with scarcely room sufficient for our feet; the scenery was indeed beautiful and grand by turns, one while presenting verdant meadows, thickly begemmed with flowers, and bounded by dark woods of various shades, at another time changing to dark and frowning rocks, towering high in wild confusion, like the ruins of some ancient and mighty castle of the fabled giants. In shady places hoar frost was lying thick upon the grass. The path became at length so rugged and unfit for riding over, that we sent back the rest of our ponies and determined to perform the remainder of our trip on foot, which soon proved a case of necessity.

We breakfasted about half-way, on the side of a grassy hill, near a large flock of sheep which were folded beneath a huge overhanging rock, and guarded by several fierce and powerful hill dogs.

Large flocks of sheep are pastured on these open patches, and as the pasture is consumed they are driven on to others, always tended by their sagacious and watchful guardians the dogs, to whom indeed the care of the flock is almost entirely trusted, the men lying idly by or knitting shoes and socks of worsted. When in want of a sheep or lamb we found great difficulty in inducing these people to part with one out of a flock of several hundreds; if we succeeded in

attaining one, it was always lame, sick or past breeding and only fit for our dogs.

The reason is, because the sheep are a great and indeed their only source of profit, and are kept for the sake of the wool which is manufactured into blankets and coarse looees *(lúís)* and sold or bartered for other necessaries.

After breakfast we again pursued our journey over similar ground, and at length halted on the side of another open grassy hill called by the guides *Túta*, the village of *Thar* being far below us in the *khad*. Supplies of grain, ghee and milk were easily procured.

On the side of this hill and along the latter part of the march since breakfast, plants of the wild iris were abundant and apparently of two kinds: I say apparently, because I could only judge so, from the seeds, which differed not only in size and color, but grew somewhat differently, the largest seeds being close to the ground on a short stalk, and the smaller kind raised on a stalk of six or seven inches long. The plants had long ceased to flower, as the seeds were ripe and falling.

Some of these plants and seeds I collected and on my return to *Simla*, the former were planted and have this year (1837) put forth beautiful dark flowers of about half the size of the garden iris, and having the outer or hanging petals spotted with deep lilac, instead of being somewhat striated as in the cultivated plants at *Simla:* the whole flower is much darker. Whether known or not I leave botanists to decide.

This place was the first good monaul ground we came to, and the sportsmen of our party shot several fine birds in the afternoon. It is a beautiful sight to see a cock monaul rise from the cover; he takes wing rapidly down the *khad*, uttering a loud and musical whistle which he quickly repeats during his descent, until he again alights. They are very fond of perching themselves on the top of some bare rock or stone and thence surveying the ground around them. In the morning and evening while feeding, it is difficult to get near them, as they are wary birds, but the best time to get them is during the heat of the day when they are lazily reposing among the brushwood covers and are unwilling to rise, thus allowing you to come near enough to make pretty certain of bringing them down. Being strong birds, they sometimes manage to carry away a good deal of shot.

A sportsman can generally tell whether birds are in the neighbourhood, by observing the holes which they make in the ground in search of roots and insects. It is a curious thing, that when the monaul is

kept in confinement the bill, from wanting the friction caused by digging in the ground, becomes very long and hooked.

One of the party here shot a solitary snipe in a small patch of boggy ground near the camp. It is identical with that described by Mr. Hodgson as the *galinago solitaria* of *Nepál*.

After breakfast on the 29th we started over very hilly ground and narrow broken paths, guided by the shikáris of the party, and made a short march to a nameless place in the forest, on the side of a hill. No village being near us, we were obliged to bring on supplies from the last halting ground. Wild iris again abundant.

To-day some monauls and a young musk deer were shot. It has often been said that the musk deer is not eatable on account of the strong flavour of musk imparted to the flesh. We had the young deer dressed and all pronounced it to be excellent, and in my opinion, far surpassing any venison I have tasted in India.

The young deer has no musk bag and therefore cannot be offensive, and the same must apply to the female, who is also destitute of the musk. An old male may very possibly be bad eating, but so I suspect would be an old he-goat!!

On the 30th we marched up very steep and rocky ground, breakfasting at the edge of a wood and afterwards pushing on again over narrow paths, sometimes affording barely sufficient room for our feet. One of our party unfortunately fell and cut his knee, in consequence of which he came on very slowly, and complained much of pain.

This day we encamped at a village called *Shurmallee*.

Chicores and college pheasants were abundant here. Supplies of grain, ghee and milk procurable. We saw here among the trees, large flocks of the beautiful scarlet flycatcher and its yellow female, *(muscipeta flammea,)* as also the nutcracker crow.

Both of these birds are common at certain seasons at *Simla, Mahássú* and other places in the interior. I saw also at this place a fine hill fox.

There is a quarry of very good clay slate at this place, with which the houses in the village are roofed. Supplies of grain are by no means scarce among the villages on this route, and so far from being inconvenienced by the demands of our servants and coolies, as we had been led to expect, they have sufficient to trade upon and send grain of different kinds to *Rampúr* and other places. The country is well cultivated and judging from the appearance of the crops, and the healthy and well clad natives in the villages, the produce must be plentiful.

Having halted a day for our wounded companion we again resumed our journey on the 2nd October up a very precipitous and rocky ascent of several miles, and had rather a fatiguing march, the latter part of the way lying through dense forests with occasional enormous masses of rocks intercepting our path; caves and traces of bears were numerous. We at length encamped in the middle of the forest with beautiful bold rocky scenery around us. Here, close to us in an opening of the forest was another large flock of sheep.

Whilst engaged in collecting mosses and lichens, which were here very beautiful and growing in abundance on the trees, I was startled at hearing a bear roar at no great distance from me. On returning to camp however, to give notice to the sportsmen of the circumstance, I learned that a shikárí had come suddenly upon the animal which caused him to roar, while he scuttled away in one direction and the shikárí another as fast as their legs could carry them, both wondering no doubt, why his enemy did not seize him! We failed in finding him again.

The night was very cold and the water froze in the jugs. This day our supplies came from a village called *Thargong*, in the perguna of *Suppael*, at some distance down the *khads* below us, and the zemindar who was a fine ruddy-faced fellow, was very fond of snuff, which he carried wrapped up in a piece of paper, and stuck in the rim of his bonnet. Having a box in my pocket, which was labelled, and had once contained, "antibilious pills," I presented it to him, with which he appeared highly delighted, twisting and turning it about much after the manner of a monkey, and laughing and talking with his companions on his good fortune. He instantly put his snuff into it, took a pinch with an air of some consequence and threw the paper from him; this was secured by one of his followers, as being very strongly impregnated with tobacco, it answered the double purpose of snuff and snuff-box!

The dress of the people hitherto consisted of the common cloth hill-cap rolled up all round, and the body clothed with blanket fitted close over the breast, plaited round the waist and falling to the knee, like a highlander's kilt; on their feet they wear a sort of half shoe, half sandal, sometimes made of string plaited like chain work, with soles of the same or of leather; others are made of coarse hill cloth or blanket and soled with leather.

In cold weather, too, they wear blanket trowsers, wrinkled and close fitting from the ankle to the knee, round which it becomes full and loose so as not to offer an impediment in climbing a hill.

In the tout ensemble of a well dressed hill-man of the interior, there is a rough and independent bearing which added to the distant resemblance in dress, not unpleasingly reminds one of the sturdy mountaineer of old Scotia. In make they are robust and well limbed, with legs that would be far from disgracing even the much loved tartan of the Gael.

The ottah or flour is carried in the skins of goats roughly formed into bags, with the hair left on.

Our march on the 3rd October was long, owing to the scarcity of water, and the path lay one while over dark and frowning rocks with the traces of bears on every side; and at another, through deep forest tracts.

The changes of temperature were here very great, for over the bare rocky pathway the sun glowed with such vigour, that we were compelled to toil up the steep ascents with our coats thrown off, while on entering the forest tracts, the air struck so damp and chill that we were glad to put them on again. At length we halted beneath a lofty hill, called *Callag* or *Carrag*, far removed from any village. On the hill above us we found a bed of juniper bushes, the birch tree and mountain ash, while at the lower ground where we were encamped, currant bushes both black and red were in abundance, and all bearing quantities of fruit, but possessing little flavour.

Here again we found the monaul and also the Cornish chough[5] or red-legged crow (*phyrrocorax graculus*). Bears were very numerous and their traces quite fresh, and covering the ground in the vicinity of the currant bushes, which were broken down and destroyed in many places, in the attempt to obtain the fruit.

After breakfast the next morning we proceeded down a steep and wooded glen, the path often interrupted by a hill stream, over which sometimes we had difficulty in passing; fallen timber also impeded our progress not a little. This glen was thickly wooded the whole way and at last debouched upon a very pretty spot enclosed between high hills. Here we encamped at a small village called *Demrara*, in the perguna of *Bansúrr*. Supplies procurable.

Walnuts, peaches and crab apples were here growing wild in the jangals. The chough was very numerous at this place, roosting among the rugged cliffs above our encampment.

In the lower and moister parts of the glen during this day's march we found many plants of the beautiful *mulgedium sagittatum*, a figure of which occurs in Royle's illustrations; the plants were in flower and also bearing seed.

At this place I purchased as a curiosity, a small hookah. It is made of the horn of a wild goat[6] and is one of the simplest and roughest pieces of workmanship I have seen. The bowl is formed of the horn, the largest end of which is stopped with wax and resin, while in the smaller end a reed is inserted to draw the smoke through. On the upper edge of the horn near the broad end, another small reed is fixed which supports an unbaked clay chillum to receive the tobacco.

On the morning of the 5th we walked up a steep ascent to a large village called *Rowul* or *Role* where we rested awhile under the shade of a magnificent horse-chestnut tree.

The temple at this place was ornamented with the horns of the *Jehr* and also of goats. It seems a common practice in these hills, when a person wishes for the birth of an heir or the successful accomplishment of any undertaking, to sacrifice a goat or a sheep to the deity.

The sacrifice is performed by beheading the animal with a sacrificing axe of a particular shape, generally called a *dangrah*,—by Europeans termed a *Jubal* axe, from the circumstance of the best being manufactured in the *Jubal* country, near the *Chor* mountain. The animal when killed is taken home and eaten and the horns hung up at the door of the temple as a propitiatory offering to the *Devi*. There is a temple in almost every village and all have these offerings hanging about them. There is generally also a temple of this kind erected on the summits of the highest hills. On the tops of very high mountains and far from any habitation are often seen piles of stones, such as in the highlands of Scotland would be called "cairns;" these piles are dedicated to *Devi* who seems to be the favourite deity of the hill people*. Every person who has occasion to pass these cairns, or whose piety may lead him to them, places a stone upon the heap as an act of homage to the deity, and when these have become too high to be easily reached others are commenced. On these piles very fine specimens of horns of different animals are placed, and sometimes real curiosities may be purloined from them, but of course by stealth, for the natives would not fail to resent the affront offered to their gods, if they discovered it. We saw these piles, but found no horns. The elevation of *Rowul* is 9400 feet above the level of the sea.

Having rested here awhile, we again ascended a very steep and rocky pass of great height, and after a long and fatiguing march in a hot

* With good reason, *Párbatí* being the daughter of the sacred mountain, (see Mill's *Uma*, J. A. S. vol. II.)—Ed.

sun, halted at a village called *Yachlí* or *Einchlí*, in the perguna of *Rájghar*.

From this place we had a splendid view of the *Rowal* ghât or pass, covered with snow and distant as a crow flies, about 12 miles. It lay to the left of our route. This pass attains an elevation of 15,555 feet. Some fine horse-chestnut trees and elms overhang this village. The latter trees were sadly disfigured, being little better than tall trunks with knots of young shoots springing out here and there; this is occasioned by the practice of cutting the tender branches and young shoots for sheep and cattle during the winter and other seasons when pasture is scarce.

A few chicores and college pheasants were all the game we could find.

On the 6th we descended into a *khad*, at the bottom of which ran a deep and rapid mountain torrent called the *Undraití* river, which runs down and joins the *Pabbar* at *Shèrgaon*. This foaming torrent we were obliged to cross on what seemed to us inexperienced travellers a very rude and frightful bridge. It was merely the trunk of a tree with one side shaved flat, thrown across the river at a height of between 40 and 50 feet above the water, which ran roaring and boiling along between two enormous masses of rock. A fall from this rude bridge would in all probability have been fatal, for should a person escape falling on the rock, he would inevitably be carried down by the torrent, and probably receive some stunning blow in his rapid descent, and be drowned before he could make an effort to save himself.

We hesitated for a short time, but finding no place to cross the river except at this bridge, we of necessity took courage and passed over one after the other, by holding the hand of a shikárí who preceded us. Even our hill people hesitated and one man did actually trust himself to the stream in preference. Two sheep attempted to cross but one of them slipping fell over, and was carried down a long way before he could get out again; the other one seeing his companion fall, turned back, jumped into the stream and swam across with some difficulty. The one that fell would not make a second attempt and was carried over on a man's back. Some of our dogs even were carried over!

After crossing this stream we climbed a hill for a few miles, till we came to a spring of water, where we stopped to breakfast and afterwards continued our route to a village called *Cabal* or *Khábar* where we encamped.

The natives of this place differed much in appearance from those of

the other villages we had passed. Many of them possessed a good deal of the Chinese cast of countenance, and had the beard and moustache growing in thin straggling tufts. Their eyes too were small and faces flattish. On their heads also they wore a different kind of cap, it being somewhat conical with a kind of tassel or button at the top. Others looked very like Jews and reminded me of the Bohras of *Neemuch*.

Many splendid elms and horse-chestnut trees, as also mulberries were growing here. During the autumnal months, the grass and other plants are cut and made into hay for the cattle during the winter; instead of being stacked, however it is loosely twisted into ropes of some length and then thrown across the branches of the trees near the villages, from whence a rope is taken as required. In other places it is made into small bundles and stuck or *filed* upon a long sharp pointed stake driven into the ground.

The horse-chestnut trees grow to a very large size, throwing out immense branches which yield a shade wide enough to encamp under; in October these trees were all bearing fruit nearly ripe, so that they must flower in spring or early summer. How beautiful must such enormous trees appear when covered with flowers!

We heard from these people that a party which preceded us to the *Bürenda* pass, had lost three men in a snow storm.

After leaving *Cabal* we proceded along the side of a barren hill, for some miles, and then gradually descended to a mill stream, where we breakfasted. These mills or *panchakkís* are very numerous on the hill streams near a village, five or six being often turned by the same water, within a few yards of each other.

After breakfast we continued our journey up a very long, steep and rocky height, having a beautiful valley below on the right hand, with the Pabbar river rolling and tumbling along through it, many waterfalls from the precipitous rocks on our right, contributed much to the picturesque beauty of the scene. We found the sun so powerful during this day's march, that we walked without our coats, and at length encamped beneath an immense walnut tree at a village called *Pekha* or *Piki*.

Here we were presented with a small basket of *Kanáwar* grapes and a quantity of very fine honey in the comb.

Bees are domesticated in almost every village throughout *Bassáhir*, but are not kept in hives in the open air as in Europe; the walls of the houses are made with several small square boxes in them which externally are even with the wall, and give egress and ingress to the

bees through a small round hole ; the door of this box or hive opens into the room, by which means the honey is easily taken out, and that too without, as in Europe, sacrificing a great number of the bees, for by blowing the smoke of burning grass or straw into the box through the doorway, the bees are driven out by the external hole, and thus the swarm is uninjured, and a portion of honey being left in the box, soon entices them back again.

In this village was a temple of *Devi* only half finished, and the villagers begged us to give them some quicksilver as they intended to consecrate the building in two days' time, and the mineral was required to complete the ceremony.

On the 8th we started at daybreak and breakfasted at *Janglig*, which is the last, and according to Dr. Gerard, the highest village in the valley of the *Pabbar*, being 9257 feet above the sea, and is the usual halting-place for travellers, being about six miles and a half from *Piki ;* but wishing to get on we proceeded another march through very pretty woods and interesting scenery to *Liti*. The latter part of the march, however, was wild and barren enough, no trees growing except a few straggling birches, and these ceased also before we got to *Liti*, the hills being merely clothed with rank grass and weeds.

Several kinds of rose trees were in abundance in these forests, and on the open hills many beautiful flowers were still in blossom notwithstanding their proximity to the snow and the lateness of the season. The greater part were, however, bearing seed or had shed it. Many flowers which on our leaving *Simla* were only just opening were here bearing ripe seed or had shed it, and the reason is obvious enough, for in these cold and elevated regions winter treads so fast upon the heels of summer that were the frost to set in before the seeds were perfected, plants would be destroyed and thus all animals, and in a few years perennials also, would become extinct : by flowering early and shedding their seeds before the wintery blast has power to hurt them, this is beautifully guarded against ! What care and foresight is here displayed by the allwise ruler of the seasons ; what circumstance or event, however minute, however trifling it may appear to us, if the well being of this world be at all dependent on it, is overlooked or disregarded by his most gracious providence ?

I collected great quantities of the seeds of a beautiful yellow flower called by Royle *Corvisartia Indica ;* this author gives *Pirpanjál* and *Cashmere* as the habitats of the plant ; I found it in flower on the side of *Hattá* mountain in the month of September and widely

spread over the open tracts between *Janglíg* and *Líti*, bearing seeds, and afterwards at an elevation little short of 14,000 feet, among the snows above *Líti*, where it was also abundant and in seed.

On this march the traces of bears were frequent. Near *Líti*, we passed one of the "cairns" above alluded to, and our servants placed a stone on it, passing on the right side of it, which we were informed was always the custom, it being considered unlucky to go the left side.

At *Líti* is a bungalow, or rather an apology for one, there being windows without glass or shutters, and the two rooms wanting floors and ceilings. It is evident however that the planks of the ceiling have been torn down to furnish fuel for travellers. We arrived late in the afternoon at this drear and desolate abode, which stands in a wild and totally uninhabited valley at the foot of the *Burenda Pass**. The neighbouring and surrounding hills were covered with snow, and rose frowning above us to a great height.

All cultivation and houses cease long before the entrance to the forest, and for seven or eight miles from *Líti* no traces of inhabitants are seen. The place is well calculated to strike a chill into the breast of a traveller, and tired as we were, with all our coolies in the rear, and with some fear lest they should not come up that night, we looked around us on the still cold scene, with no pleasant feelings.

The sun too, beginning to get low and the sharp cold of evening coming on, with still no signs of our coolies and baggage, we began to think of retracing our steps till we should meet them, and had actually commenced a retrograde movement, when some of the servants came up and told us that the coolies were not far behind, so we went back to the horrid looking bungalow.

Our people at last coming up, we got the tents pitched and gave up the bungalow to our servants, as the night promised to be bitter cold.

The water froze before 9 o'clock at night in our goglets and at daybreak the next morning the thermometer stood at 25°.

The day broke on the morning of the 9th October, with thin fleecy clouds flying about and the villagers who had come on with us from *Janglíg* with supplies of ottah, and who were in the habit of crossing the Pass, advised us not to attempt it that day, as it is always dangerous when clouds are about. We therefore deferred our journey,

* This pass, generally known to Europeans as the '*Burenda Pass*,' is called by the natives *Booren ghátti* and *Brúoang ghátti*. The last name is derived from that of a village on the *Kanáwar* side.

We therefore deferred our journey, and ascended another hill overhanging *Líti* on the right bank of the *Pabbar* from the top of which is a waterfall, forming a stream which running down past the bungalow gives it its name of *Líti* or *Lítung*, and empties itself into the *Pabbar*.

Near the top of this hill we crossed an immense bed of junipers, bearing flowers and berries with the same strong flavour as those of Europe. These were growing at an elevation little short of 14,000 feet and above the lowest line of snow, yet here among the moss scattered beneath them, I found shells of the genera *Nanina*[4] and *Bulimus*. The difference between these and others apparently of the same species which I discovered at *Mahássú* and *Hattú* consists in size only.

In the former localities they are larger and less ventricose in the whorls, but the colors and markings are the same, as it would also appear are their habits, for at this spot, where snow lies for a great part of the year and which borders on the regions of eternal snows, the animal closes the aperture of the shell with the same thin gumlike substance as those of the warmer hills of *Mahássú*.

From *Liti* to the waterfall, is a steep and somewhat difficult ascent, of about 2000 or 2500 feet, after which a flat piece of land walled round with lofty snow-clad peaks, presents itself, through which the stream that supplies the waterfall, and which owes its origin to the snows above, slowly winds along.

Here I found some beautiful flowers growing among the moss and lichens above which they scarcely peeped, as if afraid to lift their heads into the chill and desolate region around them. Some of them occur in Royle's work on the Himálayan Flora such as "*Dolomiæa macrocephala*," which was abundant and in flower! and "*Corvisartia Indica*," widely spread and in seed.

Numbers of shrew mice (*Arvicola*) are found at *Líti* and high up the hills around it, as also a species of marmot[6]. This latter is about the size of a large rat, but the countenance and general formation externally have more the appearance of a young rabbit than a rat, especially as the tail, so conspicuous in the rats, is wanting in this little animal. One of these we were fortunate enough to capture; the length was scarcely six inches. Upper incisors with a deep groove; fur above deep gray like a rabbit, with a reddish tinge over the head, shoulders and sides. Whiskers very long. Ears rounded. It seems most nearly to approach the *Arctomys Bobac* of Desmarest, or *Mus arctomys* of Pallas, which is said to be found in *Poland* and northern *Russia*, but the length is given as 15 inches, whereas this is barely six.

They burrow like rats on the side of the grassy hills. Some of our party said they saw much larger ones than that above described, in which case there were two kinds, as our specimen, judging from the teeth, was decidedly adult.

Royle figures an animal very similar to this, which he obtained from the *Chor* mountain, under the name of "*Lagomys Alpinus*," Desm. or "*L. Pika*," Geoff.

I hesitate to decide whether our animal is distinct from that of Dr. Royle because the specimen was so stiffened and dried when I had leisure to examine it, that I could not ascertain whether the incisors were those of *Lagomys* or *Arctomys*, and it is possible that what I considered a groove in the upper incisors, may be the separating line of the teeth, and in this case I should consider the animal identical with Royle's. I shall soon be able I hope to decide, as men are gone in search of specimens, both to the *Chor* and *Burenda Pass*.

After staying a short time in this dreary spot and collecting as many seeds as I could conveniently carry, I followed the rest of the party who had already got far on their way down again, for the clouds had now gathered all round very heavy and promised a storm; the wind too became high and bitterly cold and very shortly after we had regained our tents, we experienced a fall of hail, while up the dreaded *Pass*, the snow was falling fast and made us sensible of the risk we should have run in attempting to cross it on such an uncertain day.

After the storm, which did not last long with us although the pass continued obscured and hazy, I went a short way up one of the hills to gather the seeds of some plants I had observed in the morning, and was in a shower of snow all the time; some of the party went up another hill a little way and experienced the same thing, while around our tents it was all clear again.

The seeds alluded to, were of a pretty little plant very abundant near *Lití* bungalow, called by Royle "*Gualtheria nummulariöides*;" the seed-pods were of a bright blue color, and as numbers were growing on the same plant, they had a very pretty effect, peeping half hidden from behind the small dark green leaves. Here, also, I found a large bed of wild shalots.

At night it became very cold and a sharp frost set in; the thermometer at daybreak again standing at 25°, and at sunrise or when the sun topped the easternside of the *khad*, it stood at 29°.

10th October. Thin clouds were seen as yesterday, but owing to a good deal of discussion having taken place the previous evening, we determined to try the *Pass*, intending merely to look over it and return.

For this purpose we took a guide and started. The path from *Lití* wound along the side of a bare hill through a glen, which gradually became more confined and rugged, as we neared the *Pass*. On either hand, steep precipitous rocks towered above us to the height of about 3000 feet; near their base on the left of the *Pabbar* a few straggling birches were seen, and not far above them commenced the snow which became gradually deeper towards the summit of the cliffs. Along the bottom of this narrow glen, ran the *Pabbar* river, roaring and foaming as it dashed along over the rocks and stones, in its rapid and headlong descent from an immensely thick field of snow, to the left of the *Pass*, from which it takes its source. The end of this frightful glen is closed by the *Burenda* or *Bruang Pass*, whose highest peaks tower up to the height of 16,000 feet above the level of the sea.

Our guide watched the sky very narrowly during our approach to the gorge, and did not seem to think we had chosen a very favorable day for our ascent. Every thing was calm and still as death, and not a living creature was seen save the little marmot darting into its hole and the vulture-eagle roaring aloft over the snow-clad rocks. As we advanced however we heard the heavy sound which in mountainous countries often foretells a storm, and which I had heard on the preceding day. Similar sounds are emitted by some of the Scotch hills as *Bein-douran* in Glenorchy, and even the great falls on the river *Tummel* north of *Shichallain* are said to give warning of the approaching tempest*. The highlanders call this the "spirit of the mountain shrieking," and our guide seemed to entertain some idea of the kind, for he stopped and, turning to us, said something in his unintelligible hill patois, which to us sounded like, mallah banch bolta hai†."

Far above us, among the snows that crested the rocks to our left, we saw some of the *Bharal*[6] or wild sheep which are only found in the most inaccessible places.

We had now ascended some way and our breathing began to be affected, obliging us occasionally to pause and rest.

Before us lay the *Pass* now plainly laid open, and beneath it, to our very feet, was spread a bed of broken and disjointed rocks of every

* Stewart's History of the Highlanders.

† Although we made him repeat the words several times, we could make nothing of it, and therefore construed them after our own fashion, viz. that "*Mother Bunch* was speaking!!" The guides declared that when these sounds were heard thrice during the day, i. e. morning, noon and evening, it was a sure sign of a storm or bad weather. [Queré *Himála* '*back*' *bolta hai*, 'the mountain cries 'escape.'—Ed.]

size, hurled together in wild confusion from their original position on the heights above by the combined effects of frost and heat, each succeeding year apparently adding something to the general wreck produced by the wintery warring of the elements since the world began. Over these disjointed masses was spread an almost unbroken sheet of driven snow, which concealing alike the rocks and chasms beneath, proved a difficult and somewhat treacherous path.

Whilst pausing here to take breath, we espied something red lying beneath a ledge of rock at no great distance from us, and sending a man to reconnoitre, found it to be a human body rolled up in a red rezaí and frozen to death!

Our guide now without speaking, resumed the path at a quick pace as much as to say "make haste, or you see what might happen." We followed and a very few paces again brought us to another frozen victim lying on our path.

His head was bound up in his waistband and part of it drawn across his eyes, as if to protect them from the driving snow, and he had fallen apparently exhausted on his back, with the left arm outstretched and the hand clenched; one leg was drawn up and much cut by the stones among which he lay, while the other was extended. The mouth was open, but the eyes were partly closed, probably from the pressure of the bandage over them. These two poor wretches were part of Dr. Powell's attendants of whose loss we had heard at *Cabul*. Soaring round above the body were a pair of vulture-eagles[8], who seemed waiting for some assurance that life was extinct ere they ventured to descend to their repast. The body was still fresh and emitted no stench whatever, owing to the coldness and elevation of this desolate region, although it must have lain there for at least a fortnight, the party having been overtaken by a snow storm about the 26th of the previous month (September) at which time we had rain at *Nágkunda* and remarked the unsettled appearance of the weather over the snowy range. The bearded vulture waited but for some token of decomposition to pounce upon his prey, and until such took place, (so healthy appeared the body) he could not distinguish between sleep and death!

Is not this additional evidence that, "sight and scent combined," are the means by which the vulture is directed to his prey? His quick eye had rested on the prostrate form below, but effluvium was wanting to assure him that the banquet was prepared.

The sight of these poor frozen wretches, apparently in rude health at the time of their death, damped our spirits a good deal and we

pushed on towards the summit, now fully convinced that the stories we had heard, of the dangers of the *Pass*, were but too well founded.

Three of our party had reached the top, but I was still about 200 yards from it, feeling so sick and my head aching so much from the reflection of the sun on the snow, over which we were climbing, that I could not walk fast, which the guide perceiving he at once said, "We cannot wait here, so come down," and away he went, followed by the party who had gained the summit, for the clouds had gathered thick and fast during our ascent and promised a storm. On passing me, they warned me to turn and I nothing loath obeyed them instantly.

The time occupied in ascending and returning was about 4½ hours, and we had scarcely arrived at the encampment, when snow began to fall, and sick of the spot from the frightful and desolate scenes we had witnessed, orders were at once given to strike the tents and we marched off towards the forest on the road back. Never was an order more cheerfully obeyed or an encampment more speedily struck than was ours, and a smile gladdened the face of each shivering coolie as he trudged along beneath his burthen, from those regions of gloom and death.

Hail and snow fell occasionally during our march and at last we halted for the night in the forest about six miles from *Líti*, having walked at least eighteen miles during the day, and all right glad to get away from the horrid place we had left.

It afterwards proved that we had not left the Pass a minute too soon, for the next morning the ground was white with snow as low down, as our encamping ground at the bungalow! The forest near *Líti* abounds with game of the pheasant tribe; we did not stay to shoot however, as we were anxious to get back to *Simla*, some of the party being obliged to return to the plains. A monaul was killed and several others heard as also plass. A bear too was followed by a shikárí but without success.

On our return from *Líti* we fell in with three or four men from *Janglig* all carrying skins of attah on their backs; they told us they were going across the *Pass* into *Kanáwar* to barter their flour for salt which they sell to the neighbouring villages. That night they would sleep near the foot of the *Pass* beneath some bold projecting rock or at the bungalow, and push across the next morning while the weather was fine and the day before them. The storms seem to gather and break about the turn of the day, or one or two o'clock in the afternoon.

On the morning of the 11th October we proceeded to *Janglíg* where we again stopped to breakfast after a downhill march, beneath a grove of large elm and horse-chestnut trees. Here we found immense quantities of small garnets imbedded in the mica slate with which the walls are built. After breakfast we proceeded down a very steep and rocky road to the banks of the *Sapan*, a stream which empties itself into the *Pabbar*, and over which is a tolerable sankho; from this our road lay through a very beautiful glen on the banks of the *Pabbar;* it was thickly wooded and by the side of the path many beautiful flowers were growing, and among them several species of *impatiens* or wild balsam, one of them of a pure milky white.

This day we encamped again at *Píkí* which has an elevation of 8759 feet. The distance from *Janlíg* is about 6½ miles.

From *Píkí*, instead of retracing our steps to *Simla*, by the route we had come, i. e. keeping the heights and marching across the ridge of the hills, we proceeded by the regular road down the valley of the *Pabbar*, which is a most beautiful and richly cultivated country, with the river from which it derives its name running through it. The crops are chiefly rice and are abundant. Pulse of several kinds is also grown here.

From the accounts we had heard, before leaving *Simla*, of the poverty of the natives and the scarcity of supplies in the interior, we were prepared to see a country almost void of cultivation.

This, however, is far from being the case, and in the valley of the *Pabbar* especially, the luxuriance of the crops could scarcely be exceeded. Indeed, throughout our trip, nothing could be more opposed to such an idea, the natives stout and healthy in appearance, their clothing good, and crops luxuriant: every thing in fact bespeaking abundance. That they have sometimes little to spare to travellers, does not arise from any want of necessaries, but is solely attributable to their sending all the grain out of the country, keeping merely sufficient for the wants of themselves and families, and exporting the surplus which is great, into *Kanáwar* and the higher states where grains are not so easily cultivated, and where therefore they find a ready and profitable market. This surplus is either sold, or bartered for salt and other necessaries. Their rents, too, are often paid in kind; that is, in the produce of their lands. Thus it not unfrequently happens, that the very people who are striving to impress upon the mind of a traveller, that they are pinched by want and poverty, are in fact comparatively rich, and this dissimulation is prompted by their avarice as an excuse for extorting a heavy remuneration for the pittance doled out to him.

Proofs of this occurred to us more than once when we had occasion to demand supplies for two or three days, for, by offering an advanced price very little difficulty occurred in furnishing the necessary quantum.

In the valley of the *Pabbar* the standard grain is rice, which is either sold or bartered in *Kanáwar* and *Nawur* for salt and iron. The *khèts* are well irrigated by the numerous rills and mountain streams which flow down to join the *Pabbar*, thus causing little, or none of that hard labour, which falls upon this class of cultivators in the plains of India. In lands which are warmly situated and where two crops are produced, the principal grains are barley and several species of millet; the former is sown in March and April, and gathered in July, when the land is again made ready for the reception of the other grains, which are reaped in the autumn. In higher and less favoured situations and where only one crop can be perfected, the celestial and common barley, wheat and millet are sown in spring and reaped in September and October. Many other grains are also extensively cultivated, such as *bhattu* (a species of *amaranth*), cheena and *kodah*, *(panicum miliaceum* and *paspalum scrobiculatum.)* Besides these, various garden vegetables are cultivated in small quantities for home consumption.

The fruits are walnuts, apricots, wild quinces, peaches, and plums, none of which however are of any value owing to neglect and want of pruning and seldom ripen in the higher tracts. In a country where such endless varieties and gradations of climate and soils are at command, these and many other fruits might with little trouble be successfully cultivated and yield both a useful and profitable addition to their diet and exports.

The valley of the *Pabbar*, downwards from *Janglíg* is so level and presents so few difficulties, that, were encouragement given to the project, a line of road might possibly be traced out, through the valleys of the lower hills and made to debouche upon the plains. This if once effected would enable hackeries and other wheeled-carriages to penetrate to within two marches of the *Burenda Pass*, or as far as the village of *Píkí*, and offer a readier and cheaper means of conveying the products of the interior to the plains, than the present slow and expensive mode of carrying every thing on men's backs. So also the produce and luxuries of the plains would contribute in no small degree to the refinement and pecuniary advantage of the rude mountaineers, and by giving them a more extended field for speculation, encourage them to throw aside their idle habits and turn the mineral

and agricultural resources of their yet almost unexplored countries to some account.

The articles of barter and sale among themselves, and their exports, consist now of wheat, common and celestial barley, bhattu, rice, ogul opium, tabacco in small quantities, tar, turpentine, kelu oil, apricot oil, raisins, currants, ginger, neozas, iron, borax, salt, leathers and skins, chowries, blankets, woollen caps, shawl wool, potatoes, tea, and honey. The wax, too, if separated from the honey, would be an additional and abundant article; at present it is mixed up and eaten with the honey by the natives. Iron though abundant in some parts is nearly doubled in price by the time it reaches the plains owing to the mode of conveying it by coolies and the taxes levied upon it by the chiefs through whose states it has to pass.

The cattle on this side the *Himalayá*, consist of a small herd of cows and oxen, mules, sheep and goats. The sheep are pastured over the open grassy tracts of the upper hills and constitute one of the chief sources of profit, by furnishing good wool for blankets and other woollens, both for export and home consumption. Oxen are used in ploughing in the valleys, and on the hill sides when not too steep, but where the slope is great or the space confined, the ground is dug and cleared by the women, on whom indeed almost all the drudgery devolves, the men, when not engaged in transporting the produce of their farms, preferring to make woollen shoes, caps and blankets, or to lounge about idle in the villages.

That these mountains contain mineral treasures of no mean value there can be little doubt, and were research encouraged in this branch, some important results might ensue.

To some valuable discovery, made near the *Gangtung Pass* on the road from *Dabling* to *Bekhur* on the confines of Chinese Tartary, the hints dropped on his return, by the enterprising traveller M. Jacquemont, no doubt referred; why else, should he have evinced so much anxiety to prevent any European from visiting that quarter, until he should be able to make known his discovery to the French government and return under their auspices to avail himself of it?

Report says, that he earnestly entreated Major Kennedy, not to allow a European to visit that *Pass*, until his return, and added that he "hoped whoever attempted it, would fall over and break their necks*!!"

* "If an Englishman go thither, never mind;—but if a German or a French naturalist visit it,—give your guide a hint to walk him over the precipice"—was the expression, in *badinage*, of the enthusiastic traveller; certainly betokening

What the discovery was he would not divulge, but from his eagerness to shut that route to future travellers, it was doubtless of importance.

Particles of gold occurring in some of the hill rivers would lead to the conclusion that it must exist in the rocks, through which these rivers sweep, and becomes detached by the rush of waters. That gold therefore, was the discovery hinted at, is neither impossible nor improbable. It is certain that none but the precious metals would have been worth the notice of the French government.

The subject is perhaps worth inquiring into and research directed to that quarter, might bring the hidden treasures to light.

After breakfasting on the road at the same mill stream we had stopped at in coming, we pushed on as far as *Shèrgaon*, where we encamped for the night after a walk of about eight miles through a lovely valley. The village of *Shèrgaon* stands at the point of confluence of the rivers *Undraitee* and *Pabbar*. The former stream runs down through a valley of rice fields, the produce of which is held in much estimation and is reserved, we were told, for the use of the rája of *Rampore* to whom the country of *Busahir* belongs. Several of the houses in this village had small patches of flower ground, and the "Marvel of Peru" with its various colored flowers was very abundant.

On the 13th of October we left *Shèrgaon* and proceeded $11\frac{1}{2}$ miles to *Rúrú*, intending to breakfast on the road, but so well was every inch cultivated that we could find no convenient place to pitch a tent, and were therefore obliged to wait till we arrived at the village; we afterwards marched four miles farther, leaving the regular road and striking up again to the heights on the right of the valley. The whole of the march from *Shèrgaon* to *Rúrú*, is most luxuriant in rice crops, and the appearance of the natives bespeaks abundance.

Between these two places we met several Sikhs who reside in these parts and carry on a traffic with the plains.

Our camp was pitched near a small hill stream from which some fishermen brought us a dish of delicious trouts. They catch them in rather a novel manner, placing across the stream a long rod on which are fastened at short intervals a number of hair nooses, into which

that he had some curious discovery (probably of fossils) of which he would secure the first honors; and affording an amusing estimate of national curiosity.—Still is it not confirmed by the fact that no Englishman has since sifted the nature of JACQUEMONT'S interest in that spot?—ED.

the fish are driven by a man who gets into the stream and turns up the stones as he approaches the rod.

From their attitude, we at first thought they were tickling the trout as they do sometimes at home. I have seen the same fish brought from a stream below *Subathú*, and they appear to be identical with that described by Dr. McClelland as the mountain trout of *Kemaon*.

The mode of capturing them is, however, somewhat more ingenious than that mentioned by him.

Chicores and black partridges[5] were abundant at this place.

On the following day we continued our journey up the hills, breakfasting as usual on the road and encamping, after a long and steep ascent the whole way in a hot sun, on an open hill about five miles from our old encamping ground at *Tútú*.

Monauls, plass and chicores abundant.

On the 15th October we proceeded through a thick wood over very slippery paths and encamped once more at *Tútú* on the heights.

Here we found a man who had come from our last encampment to beg for some remuneration for the loss of a fine hill dog which guarded his flocks. One of our party had been chased by him, while shooting near the sheep fold, and finding a volley of stones insufficient to keep the animal from seizing him, he was at last obliged to fire in self-defence in the dog's face, from which the man said he was dying.

As a dog of this dog kind is invaluable to these poor people, he received a sum of money to enable him to purchase another and went away quite satisfied.

From *Tútú* we went next morning to *Bagie* where some of the party found their ponies awaiting them, and after breakfasting and resting awhile we continued our march, skirting *Hattú* and at last arrived once more in safety at *Núgkunda* bungalow.

At this place two of our friends left us on the following morning on their way to *Simla*; the remainder of the party halted here one day, and on the morning of the 18th October walked to *Mattiána*, through the forest across the tops of the ridges, which is a shorter and more beautiful route than by the made road.

Numbers of monauls and plass pheasants were put up and also a musk deer.

After breakfasting at *Mattiána* which we reached after a walk of $3\frac{1}{4}$ hours, I also deserted and made the best of my way to *Simla* where I arrived on the evening of the same day.

Miscellaneous and Zoological notes to the Journal.

[1] *Flowers.*—Among the most common are the "*Anemone discolor*," "*Potentilla pleropoda*," "*P. Cautleyana*," "*P. Saundersiana*," "*Chaptalia gossipina*," "*Parnassia nubicola*," "*Campanula cashmeriana*" and "*Hermineum gramineum*," of Royle. These are found at *Simla* and for several stages into the interior. Also a species of Columbine (*aquilegia vulgaris?*) and that curious flower "*Ceropegia Wallichii.*"

[2] *Lepidoptera.*—Butterflies.

Fig. 1.* "Swallow-tailed butterfly;" "*Papilio machaon.*" This is found at *Simla* and in the interior. It does not appear to differ from the European insect.

Fig. 2. Is a species which was captured in the *Serdree* jangals, near *Neemuch* and is now in my cabinet; it is here figured to show the approach to the "scarce swallow-tailed butterfly" of Europe, "*Papilio podalirius*;" it is, however, smaller than that insect and wants the eyes or ocellated marks on the wings, and it differs also in the distribution of the dark bands. It is probably not unknown to science, but is figured to show the affinity to "*P. podalirius*," and with the hope that some naturalist may favour me with its name, as I have failed to recognise it from descriptions.

Fig. 3. "Tortoise-shell butterfly;" "*Vanessa urticæ.*" The larva feeds on the nettle and is like that of Europe; it is found in May and again in July. The chrysalis or pupa is suspended by the tail. This is one of the commonest and most hardy of the Himálayan insects, and is found all the year round, winter not excepted.

Fig. 4. "Painted lady;" "*Vanessa cardui, (cynthia.)*" This is also common and found throughout the year like the last. I have seen both and also *Vanessa polychloros*, sporting in the sun, even when the ground was covered with snow. It also occurs very plentifully at *Neemuch* during the rains.

Fig. 5. "Large tortoise-shell butterfly;" "*Vanessa polychloros.*" This is not so common as the small species, but is also a hardy insect, and may be seen during the winter months, sporting about in the sunshine.

Fig. 6. "Himálayan admiral;" "*Vanessa Vulcania.*" This is very closely allied to the European admiral, but the Rev. Mr. Bree, who compared the insects in England, seems to think them distinct. See *Loudon's* Mag. Nat. Hist. from which I have copied the figure. It is not uncommon during the summer months. It occurs also at *Neemuch.*

"*Argynnis Aglaia.*" This is only met with during the summer and early autumn. It scarcely differs from the European insect.

Fig. 7. "Marbled white butterfly;" "*Hipparchia galathea.*" This is found during summer and early autumn. It is a variety only of the European insect.

* We are reluctantly obliged to omit the plate (or rather two plates) of these illustrations. Without color, however, justice could not be done to them.—Ed.

Figs. 8 and 9. "Large cabbage butterfly;" "*Pontia brassicæ*." This is a very common species, appearing in March, April, May, June, and July. In the latter month it is scarcer, as are all the hill species, owing to the constant cloudy and rainy weather. The larva feeds on the cabbage, turnip, and other plants.

Figs. 10 and 11. "Small cabbage butterfly;" "*Pontia rapæ*." This is also a common species during the summer months.

Fig. 12. "Brimstone or sulphur colored butterfly;" "*Gonepteryx rhamni*." This beautiful insect is very common at *Simla* and the interior. It appears as early as March, and is one of the latest on the wing in autumn. There is another species or variety found here in March and April, which has the superior wings of a bright sulphur like the male, and the posterior wings nearly white as in the female.

Fig. 13. "Black-veined white butterfly;" "*Pieris cratægi*." The most numerous of all and of every size during May and June. The pupa is supported by a silken band round it.

[3] *Coleoptera*.—Beetles, *Lucanidæ*, or stag-beetles. Royle figures a fine species of stag-beetle, which is not uncommon at *Simla* in July, under the name of "*Lucanus lunifer*." The female is not given, but in color it is the same, wanting as usual the large jaws of the male, and being inferior in size; both sexes are highly pubescent when recently and carefully captured.

The color is a deep olive brown; head, thorax and elytra thickly clothed with soft hairs of a pale mouse color. The jaws of the female are short and stout with a square tooth in the middle. The legs are all spiny. Length of the male from the tip of the jaws two inches and a half; female one inch and a half. In addition to these I have collected here and at *Mahássú*, four or five other species.

The food of the *Lucanidæ* being yet but imperfectly known, although it is supposed to be the sap of trees, it may not be amiss to remark that I have repeatedly found them feeding at the base of oak trees, their bodies half buried in the earth, wounding the origin of the roots with their jaws and greedily sucking up the juice as it exuded.

Cerambicidæ, Capricorn Beetles. I have taken more than 20 of the larvæ of one species out of a decayed oak tree. The insect which destroys timber in the plains, which is often heard gnawing in the legs of tables and chairs, and usually known by the name of the "Carpenter" from the noise it makes in boring; is the larva of a species of Capricorn beetle.

Elateridæ, click beetles. These are the beetles, that, when laid on their backs, can by a sudden jerk of the head and thorax, throw themselves again on their legs. In my school-boy days, they were known by the name of "backjumpey."

There is a very common beetle at *Simla* during the rainy season, which I believe to be the "*Scarabæus Phorbanta*" of Olivier's insects. It is chiefly found in heaps of cow-dung. Olivier gives *Senegal* as the habitat, but his characters which I subjoin, agree so closely with my insect, that I must consider them identical.

"Scarabæus scutellatus, thoracis cornu incurvo apice bifido, capitis recurvato bifido.

"Scarabæo gedeone paulo minor; capitis cornu recurvo apice bifido, absque dente. Thorax niger, lævis, nitidus, cornu magno, porrecto, incurvo apice bifido. Elytra lævia, brunnea: differt à Scarabæo gedeone, cornubus minoribus absque dente."

These characters are so good, that a description of my specimen would be but a repetition.

The female is similar in colors, but has no horns on head or thorax. They emit a squeaking noise when touched, which proceeds, as in many other species, from rubbing the extremities of the body and the elytra together.

These beetles differ considerably in size and in the development of the prominent projection of the thorax, some having it large and well defined, while others have scarcely any signs of it. And yet though they thus differ, they must still be regarded as one and the same species, because all couple with the same females, which also differ much in size. This difference arises from the various degrees of nourishment which the larvæ have procured, for those which obtain a plentiful supply of food, will grow to a much larger size than those which have been stinted in this respect.

The many varieties of a species arise chiefly from such causes, as a scarcity of food and prematurely becoming pupæ, (which change many undergo on finding their supplies exhausted.)

The pupa also, may be placed in an unfavorable situation, and therefore will not produce so fine a specimen as one which has been more fortunately placed. The pupæ of beetles, and perhaps, of most kinds of insects, which are buried in the earth require a moderate degree of moisture to bring them to perfection, and it may be said that even in this state, the animal receives nourishment.

In proof of this, I took a number of the grubs or larvæ and the pupæ of the present species, as well as of some other kinds, and placed them in a box of earth similar to the soil in which they were found. Many of the larvæ died from not finding sufficient nourishment, while others which were in a more forward state, became pupæ, but these were always much smaller than those which had been full fed.

The beetles produced from these were consequently small and the development of the horns very slight. The full-formed pupæ which I had taken, were placed, some *in* moist earth and some *on* the *surface* of it. Those which were buried and received nourishment from the soil, produced fine healthy beetles, while on the other hand those which were on the surface or only partially buried, produced imperfect specimens, the wings being shrivelled up and never coming to maturity, while again numbers of the pupæ dried up and never produced anything.

This circumstance satisfied me that nourishment was as necessary to the pupa, as to the larva and imago, and although the two latter alone take food, yet moisture and warmth are felt and imbibed by the pupa, and are as necessary to the

formatiou or production of a perfect and healthy insect, as food is to the larva. If moisture be withheld, the skin of the pupa shrinks and hardens and the insect has not room to expand aud perfect its parts.

From this cause I am led to believe that many varieties, have been unneccssarily raised into species and described as distinct.

The mere circumstance of their differing in size and proportions can never really separate them; as well might two brothers be deemed of distinct species because the one happens to be six feet in stature and the other a dwarf. Such a comparison is by no means absurd, because mauy of the ova deposited by our female, will eventually produce large and well-formed insects, and the rest produce their diminutives. These, therefore, can never be received as more than mere varieties of each other, and indeed I can scarcely consider the offspring of the same parents as varieties at all. The offspring of two females of the same species may possibly be reckoned as varieties of the same, should they happen to differ; but surely the hildren of one mother, produced at one birth, must be to all intents and purposes one and the same species.

Thus when two insects of the same spccies differ merely in size and the greater or lesser development of horns, spiny or other processes, they may be termed "Varieties." But a difference in structure, habits, food or general economy would alone authorize their being classed as distinct species. By difference in structure, I would be understood to mean, of diffcreut forms, because the mere circumstance of a horn or spine being greater or less, in some, than in others does not constitute a different, but only a greater or less development of the same structure.

It is perhaps a remarkable fact, that almost every species of *Coleoptera*, has its diminutive, and the only way, in which to accouut for this lies, I think, in the abundance or scarcity of proper nourishmeut they receive in the larva and pupa states.

While speaking of insects, it may be as well to observe that it has hitherto been received as a rule, that sexual commerce is unknown to the larva state; this rule cannot now wholly apply, as during the past year, I have repeatedly seen the larvæ of a species of grasshopper in conuexiou during thc summer months, at *Simla*.

[4] *Land Snails.*—Two species of *Nanina*, one (or two) of *Bulimus* (reversed) and one of *Clausilia*, being new to science, will, with many others, shortly be described in a separate paper and submitted to the Asiatic Society. "*Clausilia elegans*," nobis, is sadly destructivc to the oak of these mountains, which they seem to prefer to all other trees. They bore into every crevicc and live in the rottenness they have createcl, griuding and reducing the fibre of the wood to the consistency of wet sawdust.

In the 3rd No. of the Journal of the Asiatic Society, Dr. Royle observes, that the shells of these mountains do not differ from those described by Mr. Benson as occurring in the Gangetic provinces. Of twenty spccies which

I have been fortunate enough to discover since my arrival at *Simla* in 1836, there is perhaps only one species identical with those of the plains, all the others I believe, being new to science. It is not very surprising, however that Dr. Royle should have committed this error, because the shells I allude to, being of retired habits and only found in situations, to which his pursuits would scarcely lead him, would of course escape observation, whereas the species which probably led him into error, is found, during the rains creeping up every plant and shrub, and is the most numerous of any species. It is the "*Nanina vesicula*," of Mr. Benson, found by him at *Rajmahal*, and by myself at *Neemuch*. It is abundant from *Monee majrah*, at the foot of the hills, to *Simla* and *Hattú* mountain (10,656) and probably further into the interior.

I found a reversed species of *Bulimus* at the *Burenda Pass* at an elevation little short of 14,000 feet, which I imagine is higher than the living species have ever yet been found.

5 *Birds.*—Plass or Pucras pheasant; "*Euplocomus pucrasia.*" This bird is called by the hill people in different parts, plass, pokrass, koklass and kokrass. They are usually found in pairs and are rather shy birds. They do not bear confinement well, but pine and die in a short time. A very indifferent plate of this beautiful species occurs in the Naturalist's Library.

The breeding season is the latter end of April and all May.

College or khallidge pheasant, "*Euplocomus albocristatus.*"

This is called the college pheasant, but oftener "*Múrghí*" or fowl, by the hill people. They thrive well in confinement and might with a little attention be added to the poultry yard. Their flesh is white and delicate. The tail feathers of the male bird are somewhat arched and approach in this respect the genus "*Gallus.*" The tail is generally elevated when the bird is in motion.

These are the most abundant of the pheasant tribe in the hills and are often seen in small parties. They seem to frequent moist and wooded *khads*, whereas the plass prefers the heights. In the winter numbers are brought to *Simla* for sale at three or four anas a piece.

They breed, as the last species.

Monaul, or Bunaul; "*Lophophorus Impeyanus.*" This and the two foregoing are common from *Nágkunda* to the *Burenda Pass*. In the winter they come down close to *Simla*. They prefer forests on the hill side, in which is plenty of brushwood. They are not difficult to tame but do not live long in close confinement owing to the want of proper roots, &c. which in a wild state they are very fond of.

They breed in May.

As specimens, these and the above birds, are not worth shooting from the month of June until October, during which time they are in moult. The note of the male is a loud and musical whistle which he repeats quickly when alarmed.

They may be ascertained to be in the neighbourhood, by the holes they dig with their bills in the ground, in search of roots and insects.

In addition to these three pheasants, are found the "*Cheer*" and "*Jahgee*" or horned pheasant. The latter is only procurable during the winter season, and that only in the interior, near the snow. The shikáris who bring them stuffed to *Simla*, say that, as the winter becomes more rigorous above, these birds descend before the snow; they are inhabitants of the higher and colder regions of *Kúlú* and *Bholan*. They live in pairs, it is said.

The only species brought to *Simla* is the "golden-breasted Tragopan" (*Tragopan Hastingii*). It is known here as the Argus pheasant. The young males have the plumage of the female, with a rufous throat.

The "*Cheer*" is a beautiful bird and has more of the character of the true pheasants, than any of the others; it is found in the neighbourhood of *Simla* during winter and is not scarce. Their food consists of acorns and other seeds, as also insects. The largest bird in my collection (and I believe in *Simla*) measures in length from the tip of the beak to the end of the central tail feathers, forty-four and a half inches.

Another bird called the *Bhyre* or *Bhair* is found on the verge of the snows during winter but the shikáris say, they know not where it comes from. They live in covies like the chicore (*Perdix Chukar*), but are much larger birds. The plumage somewhat resembles that of the *Ptarmigan* in its summer plumage. By some it is called the "Ladak partridge."

Chicore; "*Perdrix Chukar*." These well known birds are numerous on the sides of bare hills near cultivation. They are easily detected by the noise they make in calling to each other. They are good eating and are sold during the winter at two anas a piece.

Black partridge; "*Perdix Francolinus*." These birds are by no means scarce in the hills, but they confine themselves to *khads* near cultivation.

Woodcock; "*Scolopax rusticola*." Is found at *Simla*, *Mahássú* and *Fágú* in *khads* near water-courses. It is probably also to be met with farther into the interior. The time of arriving at or leaving these places is unknown, but I have seen them at *Mahássú* in the beginning of August, and have had them brought to me from *Fágú* in April. It is therefore not improbable that they remain throughout the year and breed in the last mentioned places, that is in the forests of *Mahássú* and *Fágú*, where, ascending to the heights or descending into the depths of the *khads*, they can very sensibly change the temperature.

At *Simla* they have been found in November.

Three species of the *Scolopacidæ* mentioned by Mr. Hodgson in the Gleanings in Science as inhabiting *Nepal*, are found here and in the interior; viz. the woodcock, *(Scolopax rusticola;)* woodcock snipe, *(Scolopax gallinago,)* and the solitary snipe *(Gallingo solitaria)*.

I have not been able to learn as yet that the common snipe *(Gallinago media)* is found here.

Chough or red-legged crow; "*Phyrrocorax graculus*." These do not appear to differ from the European birds. They are numerous among the rocky heights of the interior, from *Carrag* to the *Burenda Pass*.

Bearded vulture or vulture-eagle; "*Gypaetos barbatus?*" These birds are common at *Simla*. I do not think they are identical with the European bird, and shall shortly have occasion to mention them in a separate paper.

6 MAMMALIA.—Leopard. *Felis Leopardus.*

One of these animals entered the bedroom of Lieut. PRNGREE 39th regiment, N. I. and seized a bull dog that was chained to the bed. During the struggle the chain was broken in two places, and Lieut. P. starting out of his sleep and seeing his pet dog beneath the leopard, he, without reflecting on the danger, instantly threw himself upon the animal and clasped him in his arms. Receiving a scratch from the brute's hind legs, *as a notice to quit*, he thought prudent to let go, when the leopard sprang through the door and escaped. The dog which was a powerful animal, was scarcely hurt.

I have a fine specimen which was shot by some villagers near *Simla*, who said he had destroyed several cows. He was a large male and rather exceeded the size given by FRED. CUVIER.

All animals should be measured previous to skinning them, otherwise an accurate statement in this respect can scarcely ever be given, as sometimes they are stretched in the process, and at others, have shrunk in the curing. The colors also should be noted previous to curing the skins or they are very liable to undergo considerable change.

Leopard Cat. *Felis Nepalensis: vel. Bengalensis.* This beautiful animal is about the size of a domestic cat and marked with dark spots and dashes on a tawny ground. Some are lighter colored than others. They are not easily got at, but cannot be called uncommon, though seldom seen.

They are found at *Simla*, *Mattiána*, *Pikí*, &c.

The natives of the hills apply the name of "*Laggarbágha*" to the leopard, while in the plains the same is used to denote the hyæna. The leopard cat, (so called by collectors,) is by the hill people called "*Chota Laggarbágha*," and sometimes "*Laggarbágha ká buchhá*" or young leopard.

I have a very beautiful specimen alive, but so savage that I dare not touch her.

They breed in May and have three or four young at a birth, which are carefully deposited in caves or beneath large masses of rock.

The following is a sketch of my living specimen. Ears rounded and without tufts. Black at the base and summits, the middle space whitish. General color above, tawny, with numerous irregular spots of black or deep brown. Whiskers white with brown spots at the roots, arising from a white ground; lips white as also a stripe between the nose and the eye. A white patch on the cheeks surrounded with black forming two bands, the lower one turning downwards and uniting under the throat. Four dark lines along the head arising from the eyes and nose, the two centre ones forming a loop enclosing a dark spot, on the forehead.

Two oblong large brown spots on the shoulders or withers. Tail irregularly spotted to near the tip, where it becomes annulated. Feet with very small spots on a lighter ground; inside of the forelegs with one dark band, hind legs with two dark bands. Under parts white, spotted with black on the belly; somewhat banded with the same on the breast. An irregular line down the back, formed by a double row of oblong-shaped brown spots.

Fur soft; eyes brown.

I have a mutilated specimen which I bought from a villager at *Pikí* in the interior; it has the ground color above rather paler than my living animal, but in other respects does not differ.

The length from the nose to the origin of the tail is about seventeen or eighteen inches, and the tail eleven inches, giving a total of about two feet, four inches.

I am doubtful whether this should be considered as the *Bengal* or *Nepál* cat: it certainly has markings in some measure common to both, and as the habitat of the former does not appear to be strictly known and the descriptions are supposed to be taken from immature specimens, it is possible that the two may prove to be the same animal. The only descriptions of these animals that I have access to, are contained in the Naturalist's Library, and the animal there given as the Bengal cat is said to have been received from *Java*. The plate does not agree with my animal although in some respects the description does. In the synopsis at the end of the volume it is called the Bengal cat with a mark of doubt affixed. It is said that the "species is hardly confirmed by any author." With regard to the *Nepál* cat the figure in some measure agrees, as also the description. It is taken from the Zoological Journal, No. 15.

Hill Fox. *Canis vulpes montana*—Pearson. During the winter, especially when the snow is on the ground, these animals are very numerous about *Simla*, and come close to the houses in search of offal or other prey. It has been well described by Dr. J. T. Pearson in the *Journal Asiatic Society*.

They breed in the end of March or early in April and have three or four cubs at a birth.

I have three young ones alive about seven or eight weeks old; they are similar to the old ones in colors, except that they are somewhat paler; the males are larger and much darker than the females.

These animals are not confined to the lower hills but range up to the verge of the snows.

I have a fine male specimen which was shot near the snow, and a female which I caught in a trap at *Simla* in May. She had evidently cubs not far off.

Canis aureus. The jackal is found also in the valley of the *Pabbar*. We saw several in the rice fields near *Shèrgaon*. At *Simla* I have often heard the cry, or what is said to be the cry, of the female, but the male, never, although I have seen them. They do not appear to hunt in packs as they do in the plains, but are seen singly.

Langoor. *Hanumán*. Entellus monkey. *Semnopithecus entellus*.

This species is found at *Simla* all the year through, but when the snow falls during the winter it seeks a warmer climate, in the depth of the *khads*, returning again to the heights as it melts away. I have seen them however, in a fine sunshiny day even with the snow on the ground, leaping from tree to tree up and down the hill of *Jakú* at *Simla*, which is 8115 feet.

Royle is mistaken when he says, that "the Entellus alone ascends in the summer months as high as 9000 feet." I have seen them at *Nágkunda* in August at 9000 feet, and in winter on *Háttú* mountain which is 10,655 feet; and in winter at *Simla* with snow four or five inches deep, and hard frosts at night, as high as 8000 feet.

Rhesus monkey. *Bundur.* "*Simia rhesus.*" This species I saw repeatedly during the month of February when the snow was five or six inches deep at *Simla*, roosting? in the trees at night, on the side of *Jakú* and apparently regardless of the cold. It is somewhat hazardous to walk below a troop of these latter animals, for in searching for acorns and other seeds, they turn up the stones which are apt to come tumbling down on ones head.

The *Langoor* ascends and descends, from and into the *khads* by prodigious leaps from tree to tree, while the less timid *Rhesus* confines itself to the ground and mounts the trees only when pursued or to roost at night.

Flying Squirrel. *Pteromys.*

These are beautiful animals and leap with amazing agility from tree to tree. Their food consists chiefly of the young leaves and tender shoots of the oak tree. They breed in the holes which they gnaw in the trunks of trees and generally have one young one at a birth. When at rest they wrap themselves partially up in the lateral membranes and curl their long bushy tails around their heads, like the common squirrel of Britain. They are easily tamed when taken young. I have offered them various kinds of food, such as grain, wheat, leaves of trees, &c. but although they will eat attah cakes the favorite food appears to be oak leaves. When feeding, they sit up on the hinds legs and hold the food in the forefeet like a squirrel.

I have a living specimen which was brought to me from *Nágkunda*, along with its mother when quite small in the month of February, so that it must have been born in the latter end of January. There is another species much smaller and of a gray color sometimes met with in the interior, but from the few specimens brought in, it appears to be scarce.

The present species is of a deep red brown, interspersed with gray hairs ; feet and tip of the tail black. Under parts pale orange.

I have no descriptions to refer to and therefore have not named it.

Wild goat. *Jehr. Capra jharal*—HODGSON.

We saw none of these animals during our trip, although our shikáris told us we crossed some of their haunts.

The Ghoral, (*Antilope Goral,*) and *Kukur* or Barking deer,(*Cervus Ratwa,*) are also met with at *Simla* and the interior. During the winter of 1835-36, a great number of the latter animals were killed in the snow, which lay in the month of February at *Simla* six to eight feet deep, and had not all melted away in shady places until the end of May !

Wild sheep. *Bharal. Ovis ammon.*

This animal is only found in the most inaccessible places among or verging on the snows. Their skins are brought down by the Tartars to the *Rampur* fair in November, and sold at about a rupee a piece. Their horns are presented to *Devi* and are hung up at the temples, or placed upon the cairns alluded to in the journal.

Musk deer. *Kastúra. Moschus moschiferus.*

These animals are found in the depths of the forest from *Muhássú* far into the interior. They appear to be shy and solitary animals, lying singly in the most retired places, usually near some steep overhanging rocks. On being disturbed they bound away down the *khads* with great swiftness. The animal is of a dark

gray above, lighter on the inside of the limbs and beneath. The ears are large and usually carried erect. The males have no horns, but are furnished with two long recurved canine teeth hanging over the under lip from the upper jaw. The use of these, whether for defence or digging roots when the snow is lying on the earth in winter, is as yet, I believe, doubtful. The females and young males have neither these teeth nor the musk bag. It is a plump-looking animal and graceful in its movements, and when taken young is easily tamed. The natives of these hills call it "*Kastúra*."

A figure and description of this animal, taken from a specimen in the Edinburgh College museum appears in the "Naturalist's Library." The color is there given as "dark reddish brown," while all the skins I have seen of the musk deer of these hills were dark grey; in old specimens a faint reddish tinge was spread over the upper parts. Neither do the habits of the animal, as stated in that work, as far as I can gather from the hill shikáris and my own observation, agree with those of the animal known here as the musk deer. I transcribe a few lines, the better to point out in what the difference consists.

"Its habits, in fact, are similar to the chamois and some of the mountain goats, climbing and bounding among the precipices of the Alpine ridges of Central Asia with astonishing activity, assembling in herds, and often appearing in very considerable numbers." "They inhabit the region between *China* and *Tartary*, extending to the mountains above the sources of the *Indus*, and northward to near Lake *Baikal*.

At times they appear to migrate from one district to another, assembling previously in large herds. Some zoologists however have considered this assemblage not connected with migration, but consisting entirely of males in search of the female."

The *Kastúra* or musk deer of these hills is to be found in the deep forest shades of *Mahássú* throughout the year; I have seen them found from that place to the *Burenda Pass* and invariably single, sometimes a male, sometimes a female. The information obtained from the shikáris, is that they lie singly at all times except the rutting season, when a male and one or more females may be found together or near each other, but only for a short time. That they are never seen in herds. They breed in May and June at which season the shepherds in the interior catch the young ones.

I have seen the musk deer single in June, August, September, and October, and as they breed in May and June, they have only the most inclement season left for migrating, which is contrary to nature, as animals migrate in order to avoid inclemency. May there not be another species beyond the *Himálaya?*

The color of the specimen in the *Edinburgh* museum may be owing to the preservation used in preparing the skin!?

It is generally supposed that the musk of this animal has some connection with the rutting season, it being strongest at that time. The idea I think is strengthened from the circumstance of the animal living such a solitary life, as the musk becoming strong at the season of love, is a means of guiding the females to the male, and thus the reason is plain why sometimes one and sometimes more females are found with one male; for in the almost endless forests of their haunts it may sometimes happen that only one or two deer may be found, while at other

times several may be in the neigbbourhood. This idea too, is more probable than that the male should seek the female, which being destitute of the musk, could in these immense tracts leave no guide to the male.

The circumstance of the female seeking the male, is by no means an anomaly in nature, for the *Cicada* tribe among insects, and the *Gryllides*, are led to the males by the sharp noise emitted by them.

The same reasooing may apply to the *Civet Cats*, which likewise emit the strongest smell, during the season of love.

Marmot? *Arctomys?*

These animals live in very large societies and feed on grasses and roots. They burrow in the earth like rabbits, to a great depth, and the holes are so connected under ground, that it is almost impossible to dig them out.

During the winter months they remain asleep in their subterranean retreats. They are the tailless rats mentioned by Turner, Herbert, Gerard, and other travellers.

Thibet Bear. *Ursus Tibetanus.* These animals are numerous in the interior but only visit the neighbourhood of *Simla* during the winter, retiring again as the weather becomes hotter.

There is another kind of bear among the sooty regions of a dirty sandy color. I once saw a tame one, but foolishly made no note on it.

The natives draw a strong line between the two, and say that the black bear lives on fruits and roots, while the sandy bear eats flesh.

Gerard mentions having seen the latter and says the two are identical.

[A note received while this is in the press adds to the above list of birds and animals found in the *Simla* hills some others known from Mr. Hodgson's Nepal collection:—the "*Surrow*" or *Eimoo:* the *Martis flavigula* in pairs, decidedly plantigrade—the *Lynchus erythrotis*, Hodg. Also a weasel found in villages, like *Mustela vulgaris.* We have not space for particulars.—Ed.]

Note.—For the altitudes of the different places mentioned I am indebted to the kindness of Captain P. Gerard, residing at *Simla.*

[We take the opportunity of appending to Lieut. Hutton's paper a table of barometric heights taken in a trip to the *Burenda pass* by Mr. E. C. Ravenshaw, C. S. in 1829, which has been some time in our possession.—Ed.]

				Baro.	*Th. att.*	*det.*			*Feet.*
May, 18	6½	P. M.	Bridge at the Jumna, ...	27.71	70	67	=	about	2193*
19	11	A. M.	Tents at Nagthí, ...	24.12	74	70	=	..	5795
20	4	P. M.	Muktí, ...	23.984	68½	71	=	..	5805
21	7½	A. M.	Thanna Túngra,.....	23.040	66	60	=	..	6851
22	10	A. M.	Teots on Deobun, ...	21.932	62	63		..	7947
24	6	P. M.	Búndroulí,.....	24.65	70	67		..	5253

* N. B. In this rough calculation of the heights after deducting .003 of an inch for every degree of heat above 32° in the attd. thermometer, I have allowed 1000 feet for every degree of the barometer below 29.789, (which from the No. 34 of Gleanings of Science appears to be the average height of the barometer at the sea, taken the height of Calcutta at 25 feet as estimated in Lieut. Barnes' letter in the same No.) In Nicholsons' or the Edinburgh Encyclopædia only 900 feet are allowed

			Baro.	*Th.*	*att.*	*det.*		*Feet.*
25	Noon	at Dhargadh stream,	26.69	74	74	..		3265
	7 P. M.	Kandhú,	25.28	66	64	..		4611
26	7 A. M.	At the Jhúla over the Tonse,	27.023	60	60	..		2830
27	10 A. M.	Earí on the Pabbar,	26.17	77½	77	..	*	3754
28	10 A. M.	Temple at Hath,	25.35	84	77	..	†	4595
29	10 A. M.	Rúrá,	24.97	75	72	..	‡	4948
30	10 A. M.	Sérgaon,	24.22	80	76	..		5713
31	4 P. M.	Pèka,	22.15	59	53	..		7720
June 1	8 A. M.	Janglíg,	21.568	64	58	..		8221
2	3 P. M.	Líti,	19.62	52	50	..		10229
3	9¾ A. M.	Crest of the Búran Ghât or Burenda Pass,	17.211	56	43	..		12650

II.—*Discovery of the Rekhá Ganita, a translation of the Elements of Euclid into Sanskrit by* Samrát Jagannátha, *under the orders of Rája* Siwái Jaya Sinha *of Jaipur. By* Lancelot Wilkinson, *Esq. C. S. Resident at Bhopál*§.

I lately had the good fortune to procure a copy of the *Rekhá Gauita* or Sanskrit version of Euclid's Elements, which was made by the order of Sewái Jaya Singh rája of *Jaipur*. This chief, the flower of the Hindu princes of Hindustan, ascended the *gaddi* of *Jaipur* in A. D. 1699, and died after a reign of 44 years in A. D. 1743. He was distinguished by an ardent passion for the study of mathematics and especially of astronomy, and he did more to promote the cultivation of sound science in this benighted land than any other Hindu prince on record. Some details of his astronomical labours have been published to the European world by the late ingenious Dr. Hunter in his

to a barometrical degree or inch, but as other modes of calculation adopted by Graham give more, I have assumed 1000 feet as a fair standard. With this liberal allowance however the *Burenda Pass* instead of being upwards of 15,000 feet appears to be only 12,650.

* The spot where the observation was taken being about 20 feet above the water and distance between the *Jhúla* and *Earí*, about 12 inches, 3754 — 2830 = 924 ÷ 12 = 77 feet per mile.

† *Hath* being 50 feet above water and distance from *Earí* 14 miles, 4545 — 3754 = 791 ÷ 14 = 57½ per mile.

‡ *Rúrá* ditto and dist. from *Hath* 8 miles, 4898 — 4545 = 353 ÷ 8 = 44 per mile.

N. B. Observed at *Earí* in the evening that the water in *Pabbar* had fallen about 2½ inches since day break. Hove the log in shape of a tent peg, but the rapidity of stream did not prove more than 3 miles per hour, at *Shèrgaon*, *Píka*, *Janglíg*, *Líti*. Rain every day about 4 o'clock. Snowy mountains clear in the morning but invariably clouded at noon.

§ We insert this notice with pleasure because it may excite attention to the work; but the Rekhá Ganita is not unknown here.—A copy exists in the Sanskrit College, which with a Sanskrit commentary was at Prof. Wilson's suggestion to have been printed; but the *suspension order* put it on the shelf!—Ed.

papers in the Researches of your Society and by Colonel Tod in his annals of *Rájputáná*. As a legislator and statesman also he was equally distinguished. His name throughout *Rájputáná* and also in *Málwá* is to this day held in the highest veneration by all classes of the Hindu population. The *Márwári Saukárs* hold it as an article of faith that good fortune will attend their dealings if they take the name of Jaya Singh along with that of their gods in their morning orisons.

2. I do myself the honor of forwarding to you a few pages of the Sanskrit work above mentioned containing a prefatory introduction by the translator, the definitions, and a few propositions. I hope that you will be able to find room for it in your valuable and wide-spread Journal. At a time when the friends of education are anxiously busying themselves in collecting vocabularies of scientific terms in Hindí, the publication of even this specimen will not fail to be eminently useful to them; it will afford them the best means of at once enlarging and improving their previous collections of those terms in use amongst Hindu mathematicians of the present day.

3. The preface from its historical allusions has an interest of its own. Of it I have therefore added an English translation. From this, it appears, that the translator was Samrát Jagannátha a brahman, probably the author of the *Samrát Siddhánta* a treatise on astronomy generally attributed to Jaya Singh himself.

4. Dr. Hunter mentions that Jaya Sinha had treatises on plane and spherical trigonometry also translated into Sanskrit. But I have not as yet succeeded in procuring either them, or the *Samrát Siddhánta*. My search however has been of but recent date, and I have still hopes that it will not prove fruitless.

5. The copy of the *Rekhá Ganita* I procured from a Rájput of *Oujein* named Kulian Singh at present in my service, who formerly held jágire from Sindia and Holkár, whom he served in the capacity of astrologer and astronomer, and mathematical instrument maker. It contains 14 books complete, and a part of the 15th book; but the diagrams illustrative of the several propositions have unfortunately been entirely omitted. The work of supplying them and the letters with correctness so as to coincide with the explanations in the text, will be a tedious, and in some instances a difficult task.

6. Rája Jaya Singh, in his *Tij Muhammad Sháhi* addressing his work to the learned and well informed Musalmán public, did not venture even to attempt to conceal from it, the obligations under which he was well known to be to the learned Europeans and Muhammadans in his service. Our brahman translator of this work, however is guilty of one of those base acts of plagiarism and literary injustice so

common with all Hindu authors. He coolly informs his readers that the work was originally revealed by Brahma to Viswakarma; and to himself he attributes the honor and credit of restoring and reviving its revelations, which he says had in the course of ages been lost or forgotten. His object in so doing may perhaps have been rather a desire to secure its acceptance with his countrymen*, than a hope of advancing his own reputation. For at a time when the minds of the whole Hindu nation were burning with a sense of indignation at the ruthless persecutions and oppressions of the wily, bigotted and hypocritical Aurangze'b and his Muhammadan advisers, he may have apprehended the total rejection by all men of his faith of any thing however valuable professedly borrowed from the Musalmáns and their Yuuáni teachers. The fact of his hazarding a discovery of the theft, however bears ample internal evidence to the gross ignorance of even all his educated countrymen at this time.

7. The allusion in the 3rd verse to the protection afforded to the learned expatriated brahmans of *Vrindávan*, probably refers to the oppressive persecutions inflicted on the city and brahmans of *Mathurá* by Aurangze'b, by whose orders many temples and the valuable libraries they contained, were destroyed.

8. The allusion in the 4th verse to the courageous labours of rája Jaya Singh, in removing "the people-grinding impost," probably refers to the obnoxious *jaziyá* imposed by Aurangze'b. The honor of procuring its abolition he attributes to his master Jaya Singh. Colonel Tod has given to ráná Ráj Singh the credit of having written that most eloquent, and elegant, and spirited letter of remonstrance against this impost, which has been so admirably translated by Sir W. B. Rouse, and which is attributed by Orme to Jeswant Singh of *Márwár*. I have seen nothing in the Persian language of which I would more desire the honor of being the author than of his remonstrance; and if we consult the internal evidence, to what Hindu prince could we with so much propriety attribute the noble sentiments it breathes, as to the enlightened chief of *Jaipur?* To him as well as to Jeswant Singh I have heard it attributed. Colonel Tod in his partial zeal for the Rájpúts in attributing it to Ráj Singh would have us regard it as a proof of the enlightenment of his favorite *Ránáwats* of *Udipura*. But if it must be given either to ráná Ráj Singh or Jeswant Singh of *Márwár*, then to their enlightened Musalmán munshis alone can be accorded the credit of the actual composition; for we have no reason whatever

* Had he wished for concealment, he would not surely have retained the Persian order in the letters of the diagrams (see Pl. L.)—Ed.

to know that either of these princes were themselves in any degree advanced beyond that state of semibarbarism which then and still distinguishes all tribes of Rájputs.

Translation of the Preface.

Salutation to GANESHA; salutation to LAKSHMI' and NRISINHA. Upon GANESHA, who is worshipped by the gods, and fulfils all the prayers of men; who is adorned with all power, and who removes all difficulties, I devoutly call.

2. I humbly prostrate myself at the lotus feet of LAKSHMI' and of NRISINHA, which are adored even by the gods, and the fragrant dust of which is revered by all mankind. I bow in reverence to SARASWATI the destroyer of the darkness of infatuated ignorance, and to my instructor who is distinguished in the science of mathematics.

3. May the illustrious king of kings rája JAYA SINHA, who pure in heart by his own prowess and without dread brought SRI' GOVINDA and the other learned men who had fled from *Vrindávan* and settled them (in his own neighbourhood), and who has by his own force reduced to obedience *Mlechchha* chiefs of distinguished rank,—rule long over this portion of the earth.

4. He shines conspicuous by his glorious power, by which he has removed the tax under which the people were grievously oppressed; he is terrible to his enemies and like the sun in the hot season, not to be endured by them.

5. He performed the *Wujápaya* and other sacrifices, and celebrated also the 16 *Mahádán*, bestowing on the most distinguished brahmans, cows and villages, elephants and horses.

6. For the pleasure of this most illustrious king SRI' JAYA SINHA, the brahman SAMRAT JAGANNA'THA composes this most excellent work called the "*Rekha Ganita*" or geometry.

7. It is a novel and unequalled science, in as much as it teaches from a knowledge of angles clearly to ascertain the measurements of different figures.

8. This treatise on geometry (or mechanics *Shilpashastra*) was originally revealed by BRAHMA to VISHWAKARMA from whom it descended to this earth, and has been handed down from generation to generation.

9. But being lost in the course of time, I, by the commands of the Mahárája JAYA SINHA, have again published it to the world, for the delight of all mathematicians.

The *Rekha Ganita* contains 15 books and 478 propositions. In the first book are 48 propositions.

Definitions or EXPLANATION of the terms used.

1. A point is that which is visible to the eye, but is incapable of subdivision.

2. A line is long—but is without breadth: it may be divided.

3. A superficies has both length and breadth.

4. There are two kinds of superficies, the one plane as the smooth surface of levelled water, the other not plane.

5. Lines are also of two kinds, straight and curved (or crooked), &c. &c.

Original Text.

श्रीगणेशाय नमः ॥ श्रीलक्ष्मीनृसिंहाय नमः । गणाधिपं सुरार्चितं समस्तकामदं नृणां प्रशस्तभूतिभूषितं स्मरामि विघ्नवारणं ॥ १ ॥ लक्ष्मी नृसिंहचरणांबुरुहं सुरेशैर्वन्द्यं समस्तजनसेवितरेणुगन्धं वाग्देवतां निखिलमोहतमोपहन्त्रीं वन्दे गुरुं गणितशास्त्रविशारदञ्च ॥ २ ॥ श्री गोविन्दसमाह्वयादिविबुधानवृन्दाटवीं निर्गतान् यस्तत्रैव निराकुलं शुचिमनोभावः स्वशक्त्यानयत् म्लेक्षान्मानसमुन्नतान्स्वतरसा निर्जित्य भूमंडले जीयाच्छ्रीजयसिंहदेवनृपतिः श्रीराजराजेश्वरः ॥ ३ ॥ करं ज नार्दनं नाम दूरीकृत्य स्वतेजसा भ्राजते दुःसहोष्णरोचिषां यथाग्रेसरो दिवा करः ॥ ४ ॥ येनेष्टं वाजपेयाद्यैर्महादानानि षोड़श दत्तानि द्विजवर्येभ्यो गोग्रामगजवाजिनः ॥ ५ ॥ तस्य श्रीजयसिंहस्य तुष्ट्यै रचयति स्फुटं द्विजःसम्राट् जगन्नाथो रेखागणितमुत्तमं ॥ ६ ॥ अपूर्वं विहितं शास्त्रं यत्र कोणावबोधनात् क्षेत्रेषु जायते सम्यक् व्युत्पत्तिर्गणिते तथा ॥ ७ ॥ शिल्पशास्त्रमिदं प्रोक्तं ब्रह्मणा विश्वकर्मणे पारंपर्यवशादेतदागतं धरणी तले ॥ ८ ॥ तदुच्छिन्नं महाराज जयसिंहाज्ञया पुनः प्रकाशितं मया स म्यक् गणकानन्दहेतवे ॥ ९ ॥ अथ रेखागणितं प्रारभ्यते अत्र ग्रन्थे पञ्चदशा ध्यायाः सन्ति अष्टसप्तत्युत्तरचतुःशतं श्लोकानि सन्ति तत्र प्रथमाध्याये चत्वारिंशच्छ्लोकानि सन्ति तत्रादौ परिभाषा यःपदार्थः दर्शनयोग्यः विभागानर्हः स विन्दुर्वाच्यः यःपदार्थः दीर्घोविस्ताररहितः विभागार्हः स रेखाशब्दवाच्यः विस्तारदैर्घ्ययोर्यद्भिद्यते तद्धरातलं तदेव क्षेत्रं तद्द्विविधं एकं जलवत्समं द्वितीयं विषमं अथ रेखापि द्विविधा एका सरला अन्या वक्रा अथ सरलरेखालक्षणं यस्यां न्यस्ताः विन्दवः अवलोकिताः सन्तः एक विन्दुना छाद्यन्ते सा सरला अन्यथा कुटिला धरातलमपि समं विष मञ्च ज्ञेयं समं यथा यत्र विन्दुं लिखित्वा सूत्रं निःसारयेत् तद्यदि सर्व्वत्र

लम्बं भवति तदा धरातलं समं ज्ञेयं अन्यथा विषमं अथ कोणलक्षणं धरातले रेखाद्वययोगात् या सूची उत्पद्यते स कोणः सच द्विविधः सम कोणोविषमकोणश्च समानरेखायां लम्बयोगादुत्पन्नौ कोणौप्रत्येकं सम कोणौ भवतः रेखे मिथः लम्बरूपे न भवतः तत्र समकोणाद्यूनः अल्प कोणो भवति समकोणादधिकोऽधिककोणोभवति समातिरिक्तो विष मकोणोभवति समकोणस्तु सरलरेखाभ्यामेव भवति (1*) विषमकोणः सरलरेखाभ्यां सरलकुटिलरेखाभ्यां कुटिलरेखाभ्याञ्च भवति (2) (3) अथ क्षेत्रलक्षणं धरातलं रेखया रेखाभ्यां रेखाभिर्वावृत्तं क्षेत्रसंज्ञ मुच्यते वृत्तकोदंडचखचतुरस्रादिभेदेन बहुविधं ज्ञेयं अथ वृत्तलक्षणं समधरातलंविन्दु कृत्वा तस्मात्समानि सूत्राणि सर्व्वतः कृत्वा तस्मादेव विन्दुतः सर्व्वाणि सूत्राणि या स्पृशति कुटिला रेखा तद्वृत्तंज्ञेयं तदाक्रांतं धरातलं वृत्तक्षेत्रं भवति मध्यविन्दुः केन्द्रसंज्ञः केन्द्रोपरिगतं सूत्रं उभ यतः पालिसंलग्नं व्याससंज्ञं भवति व्यासस्त्रं वृत्तक्षेत्रस्य समानं भागद्वयं करोति या रेखा केंद्रगा न भवति पालिसंलग्ना स्यात्तदुभयतः खंडद्वयं विषमं भवति सा रेखा चापकर्णसंज्ञा पूर्णज्यासंज्ञाच भवति (4) अथ सरलरेखावृत्तानि क्षेत्राण्युच्यन्ते तत्रादौत्रिभुजमुच्यते तत्त्रिविधं(5) एकं समत्रिबाहुकं द्वितीयं समद्विबाहुकं तृतीयं विषमत्रिबाहुकं पुनस्तत्को णैरपि त्रिविधंत्रिभुजं भवति यस्मिन्एकः समकोणः अन्यौन्यू (6) नको णा तत्त्रिभुजं समकोणत्रिभुजंज्ञेयं यत्र एकः अधिककोणः अन्यौ न्यून कोणौ तदधिककोणं त्रिभुजंज्ञेयं यस्य त्रयेऽपि न्यूनकोणाः तन्न्यूनकोणं भवेत् अथ चतुर्भुजं यस्य बाहुश्चतुष्टयं समानं अथच कोण (7) चतु ष्टयमपि समानं तच्चतुरस्रं समकोणं समचतुर्भुजं ज्ञेयं यस्य (8) कोणच तुष्टयं समानं अथच सन्मुखबाहुद्वयं मिथःसमानंतद्विषमचतुर्भुजं आयतश्च ज्ञेयं यस्य कोणचतुष्टयं विषमं भुजचतुष्टयं समंतद्विषमकोणं समचतुर्भुजंज्ञेयं (9) यस्य कोणचतुष्टयं विषमं भुजचतुष्टयञ्च विषमं

* The figures have reference to the diagrams in plate L.

तद्विषमकोणविषमचतुर्भुजं ज्ञेयं (10) अथ समानान्तरालरेखा लक्षणं या रेखा प्रथमनिःसारितरेखया कदापि न मिलति सा समानां तराला रेखा भवति (11) यावन्तः समकोणाः ते सर्वे समानाः अथ सरलरेखाद्वयं धरातलं व्याप्तुं नशक्नोति (12) कुटिलं रेखाद्वयं (13) अथवा कुटिलसरलरेखाद्वयं धरातलं आवृणोति यत् (14) रेखाद्वयं समानान्तरं न(15) भवति किन्तु विषमान्तरं भवति (16) तत्र यस्मिन् प्रदेशे बऊतरं भवति (17) तद्दिशि वर्द्धितयोरेखयोरंतरमुत्तरोत्तर अल्पमेव भवति यावद्रेखासंयोगं तदनन्तरमंतरंवर्द्धिष्णुर्भवति यत्र कोणशब्दः तत्र सरलरेखाक्षतएव कोणोज्ञेयः यत्र रेखाशब्दस्तत्र सरलैव रेखा ज्ञेया यत्रभूमितलशब्दः तत्र जलसमीक्षतमेव भूतलं ज्ञेयं इतिपरिभाषा अथ प्रथमक्षेत्रं यदासमत्रिभुजं क्षेत्रं कर्त्तव्यं भवति (18) तत्र अबरेखा ज्ञातास्ति तदुपरि त्रिभुजं क्रियते तद्यथा (19) अंकेंद्रं क्षत्वा अबव्यासार्द्धेन वृत्तं कार्यं एवं बंकेंद्रंक्षत्वा ब अव्यासार्द्धेन वृत्तंकार्यं यत्र वृत्तद्वयसंपातः तत्र जचिह्नं कार्यं तत्र अजरेखा बजरेखा कार्या अबजत्रिभुजं जातं समानत्रिभुजंकुतःअबरेखा अजरेखा समा नास्ति यतः बजंवृत्तस्य व्यासार्द्धमस्ति पुनःबजरेखा अबरेखा समानास्ति कुतः अजवृत्तस्य व्यासार्द्धत्वात् बजंअजं समानंजातं अबतुल्यत्वात् तस्मा द्भुजरेखात्रयंमिथः समानंजातं अथ द्वितीयंक्षेत्रं अभीष्टा रेखा क्षतास्ति तदन्यत्रक्षतविन्दुतः तत्तुल्या रेखा कर्त्तव्यास्ति तत्रविन्दुअचिह्नं कल्पितं रेखाबजं अचिह्नाद्बचिह्नपर्यन्तंरेखाकार्या अबरेखोपरिसमत्रिभुजं अब दंकार्यं बकेंद्रकंबजेन वृत्तंजभबसंज्ञं कार्यं दबरेखा दीर्घावृत्तपालिमिलिता भसंलग्ना कार्या दभेनदकेंद्रकंहभतवृत्तंकार्यं दअरेखा दीर्घावृहत्पालि हसंलग्ना कार्या त (20) च अहरेखा बजरेखा या समाना जाताः कुतः दहरेखा दभरेखा समानास्ति दअरेखा दबरेखा समाना तस्मात् अह रेखाबभरेखा समानाजाता बभरेखा बजरेखा समाना तस्मात् अहरेखा बजरेखा समाना जातास्तीतिसिद्धं अथ तृतीयं क्षेत्रं ३ यत्र वृहद्रेखा लघुरेखाच ज्ञातास्ति तत्र लघुरेखातुल्यं खंडं वृहद्रेखातः भिन्नंकर्त्तव्य

मस्ति तदा वृहद्रेखा अवसंज्ञा लघुरेखा जसंज्ञा कल्पिता अचिह्नात् अद
रेखा जसमानानिष्काश्यनीया पूर्व्वोक्तप्रकारेण पुनः अं केंद्रं कृत्वाअदेन
दहभवृत्तंकार्यं इदंअबरेखातः अभरेखां (21) अदरखासमानांष्टथक्
करोति तस्मात् अभरेखा जरेखा समानाजाता अथ चतुर्थप्रकलं ४
यत्र त्रिभुजद्वयमस्ति तत्रैकत्रिभुजस्य भुजद्वयं तदन्तरगतकोणञ्च द्वितीय
त्रिभुजस्य भुजद्वयेन तदन्तरगतकोणेनच समानं यदि भवति तदाप्रथम
त्रिभुजस्य शेषकोणद्वयं तृतीयभुजञ्च द्वितीयत्रिभुजस्य कोणाभ्यां तृतीय
भजेनच समानंभवति क्षेत्रंप्रथमत्रिभुजं अबजंद्वितीयत्रिभुजं दहभं
अबंदहंसमंअजंदभंसमं अकोणदकोणौ समानौ कल्पितौ तदाबजंहभं
समं भविष्यति बकोणहकोणौ समानौजकौ (22) णभकोणौ समानौ
भविष्यतः क्षेत्रंक्षेत्रं समानं भविष्यति अत्रोपपत्तिः बअरेखां दहरेखा
यांन्यसेत् अकोणं दकोणे न्यसेत् अजंदभोपरिन्यसेत् अजंदभोपरिन्य
सेत् एवंकृते बजंहभोपरिस्थास्यति यतःरेखाद्वयंसरलमस्ति बजकोणौ
हभकोणयोः स्थास्यतः क्षेत्रंक्षेत्रं समानं भविष्यति अथ पञ्चमक्षेत्रं ५
यस्य त्रिभुजस्य भुजद्वयं समानं (23) तस्य तृतीयभुजोपरिसंलग्नंको
णद्वयं समानं भवति भुजद्वयं स्वमार्गवृद्धंसत् तृतीयभुजाधःसमुत्पन्न
कोणद्वयमपि समानंभवति यथा अबजत्रिभुजे अबंअजं समानमस्ति
बदा अजबकोण अबजकोणौ समानौ भविष्यतः पुनःअबरेखा वर्द्धनीया
दपर्यंतं हपर्यंतं अजरेखा वर्द्धिता ततःसमुत्पन्नौ बजहकोण जबदकोणौ
बजरेखाधःस्थितौ समानौभवतः अत्रोपपत्तिः बदरेखायांभचिह्नं कुर्यात्
जहरेखायांबवरेखाः समानाः जबरेखा पृथक्कार्या बवरेखाजभरेखा
च कार्या अजभत्रिभुजे अबवत्रिभुजे जअभुजः अभभुजः अकोणःबअ
भुजेन अवभुजेन अकोणेन क्रमेणसमानः जभभुजबवभुजः एतौसमानौ
जातौ अजभकोण अबवकोणा समानौ भकोणवकोणौ समानौ जातौ
अजभकोणअबवकोणौ समानौ भकोणवकोणौ समानौजातौ जबभ
त्रिभुजेबजवत्रिभुजेच बभभुजः भजभुजः भकोणः जबभजेनबवभुजेन
बकोणो नसमानोस्ति तदाजबभकोणः बजकोणः इमौदौसमानौ जातौ

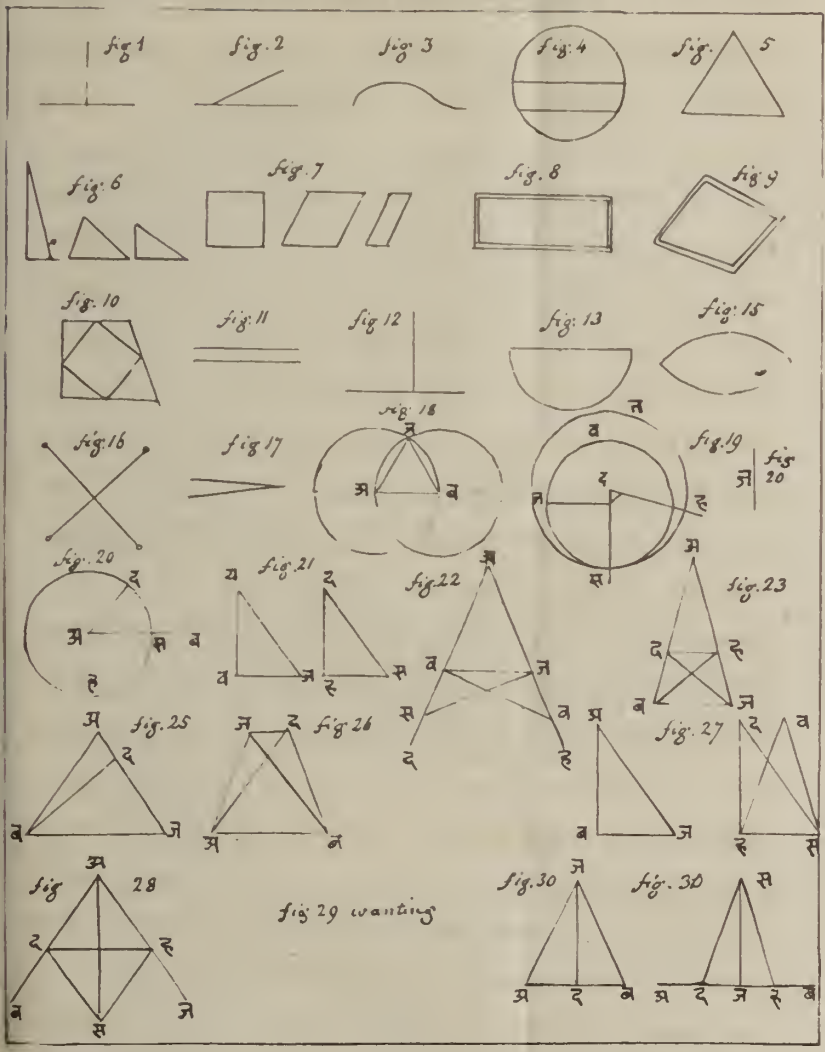
भजबकोणः बवजकोणः समौसमानौजातौ एतौ अजभकोण अबवकोण योः श्रोधितौश्रेषौ अजब अबजकोणौ समानौ भवतः इदमेवास्माकमिष्टं प्रकारांतरेण पञ्चमक्षेत्रं ५ अबरेखायां द चिह्नंकाय अदरेखा तुल्या अहरेखा भिन्ना कार्या दहरेखा दजरेखा हबरेखाच कार्या अदज त्रिभुजेदअभुजः अजभुजः अकोणः अहबत्रिभुजस्येन हअभुजेनब अभुजेन अकोणेन क्रमेण समानः बहरेखा दजरेखा परस्परं समाना जाता अबहकोणः अजदकोणश्च एतौसमानौ जातौ बदह त्रिभुजेदबभुजःबह भुजः दबहकोणः दहजत्रिभुजस्य जहभुजेन जदभुजेन हजदकोणेन समानः बदहकोण जहदकोणौ परस्परं समानौ वदहकोणः जहदकोण, परस्परं स (24) मानः बदजकोणः बहजकोणश्चैतौ समानौ बदजत्रिभुजे बदभुजः दजभुजः बदजकोणः बहजत्रिभुजस्य जहभुजेन हबभुजेन जहबकोणेनच समानः अजबकोणौ (25) समानौजातौ तदेवमभीष्टौ कोणौसिद्धौ अथषष्ठंक्षेत्रं ६ यस्य त्रिभुजस्यकोणद्वयं समानंतत्कोणसंबन्धि भुजद्वयमपि समानंभवति अत्रोपपत्तिः अबजत्रिभुजे बजकोणौ समानौ अबं अजमपि समानं यदिभुजद्वयं समानं न भवति एकःभुज अधिकःस्यात् तदाअधिकभुजः अजकल्पितः बअसमानंजदंभिन्नं कृत्वा बदरेखा कार्या अजवत्रिभुजे अबभुजः बजभुजः अबजकोणः दबजत्रिभुजस्य दजभुजेन जवभुजेन दजबकोणेन समानः वृहत्त्रिभुजं लघुत्रिभुजं समानंजातं तदिदमनुपपन्नं वृहत्क्षेत्रं लघुक्षेत्रेण कथं समानं भविष्यति तस्मादजं अबं समानं तदेवमुपपन्नं कोणद्वयसाम्येन तत्सक्तभुजद्वयसाम्यमपि भवति अथसप्तमक्षेत्रं ७ तत्रैकरेखोभयपार्श्वयोः रेखाद्वयं निःसृतं यत्र मिलितं तच्चिह्नादन्यत्र तद्रेखाद्वयमिलनंभवति अत्रोपपत्तिः (26) अबरेखाप्रान्तादन्याअजरेखा बजरेखाच निःसृता जचिह्ने तयोर्योगो जात अथ यदि तत्समानं अन्यद्रेखाद्वयं अन्यत्र चिह्नेमिलति इतिकल्प्यते तदा अजरेखा तुल्या अदरेखा बज रेखा तुल्याबदरेखादचिह्ने मिलिता स्यात् पुनर्दजरेखा निष्काश्यातदा अजदकोणः अदजकोणेनसमानःस्यात् कुतःअज अदसमानात् यत् बजद

कोणः अजदकोणादल्पोस्ति बजदकोणः अदजकोणादल्पोभविष्यति पुनःअदजकोणः बदजकोणादल्पोऽस्ति बजद कोणः बदज कोणादत्यंत अल्पःस्यात् इमौतु समानौस्तः कुतःबदबजभुजयोः साम्यात् तस्मादि दमनुपपन्नंयतः समानैकोणौ विषमौजातौ तदेवमुपपन्नंजचिक्रादन्यच भुजयोगो भविष्यतीति अथाष्टमक्षेत्रं ८ यस्य त्रिभुजस्य भुजत्रयं अन्यत्रिभुजस्य भुजैःसमानं भवति तदा तस्य कोणत्रयमपि अन्यत्रिभुज कोणैरवश्यंसमानं भविष्यति (27) तत्रैकंत्रिभुजं अबजं द्वितीयं दहझञ्च कल्पितं अत्र अबदहभुजः समानःअजभुजः दझभुजेन समानः बजभुजः हझेन समानः कल्पितः यदाभुजत्रयं समानंजातं तदा अकोणः झकोणेन समानः बकोणः हकोणेन समानः जकोणः झकोणेन समानो भविष्यति कुतःयतः वजभुजं हझभुजे स्थाप्यते क्षेत्रं क्षेत्रे स्थाप्यते रेखौ अबअजौ भुजौ दहदझभुजयोः स्थास्यतः यदिनस्थास्यतः तदभिन्नौ तिष्ठतः यथा वहवझौ कल्पितौ तत्रेयमनुपपत्तिः दहदझरेखे हझरेखा उभयप्रांताभ्यां निःसृते दचिक्रं मिलिते वहवझरेखे पूर्व्वरेखा समाने प्रांताभ्यां निःसृते वचिक्रं मिलिते इदमनुपपन्नं इदं सप्तमक्षेत्रेप्रतिपादितमस्ति तस्मात्त्रिभुजं त्रिभुजोपरि स्थास्यत्येव कोणाअपि कोणसमाना भवंत्येव तदेवमुपपन्नंयथोक्तं अथ नवमक्षेत्रं ९ तत्रकोणस्य समानभागद्वयकरणं प्रदर्श्यते तद्यथा बअजकोणः अत्रकल्पनीयः बअ(28) भुजे द चिक्रं कृतंतत् तुल्यमेव द्वितीयेपि भुजे ह चिक्रं कार्यं दहरेखा कार्या दहरेखोपरिदझकं समत्रिभुजंकार्यं अझरेखाकार्या इयंरेखाअकोणस्य समंभागद्वयं करोति यतःदअझत्रिभुजे हअझत्रिभुजे दअभुजः हअभुजश्च मिथःसमानः दझभुजहझभुजौ समानौ अझंउभयोरेकएवास्ति उभयोस्त्रिभुजयोभुजाः समानाः कोणाअपि समानाभवन्ति तस्मात्झअदकोण झअहकोणा समानौ जातौ तदेवमुपपन्नं यथोक्तं यदि झचिक्रं रेखयोरन्तर्गतं प्रदेशमध्येभवति रेखोपरिवा रेखायाः वहिर्नभवेत् तदैवमुपपत्तिरुपपन्ना भविष्यति अथझचिक्रंरेखयोरंतरप्रदेशमध्ये अवश्यं भविष्यति कुतःयदिमध्ये न भविष्यति तदा रेखायां वहिर्वा भविष्यति तदैतादृशं क्षेत्रंस्यात्तद्

र्थ्रनं तत्र भदहकोणौ समानौ भविष्यतः जदहकोणः बदहकोणेन समःभ
चिह्नं यदिबदभुजे पतति तदा दहजवृहत्कोणः दहजवृहत्कोणखंडञ्च
इमौ समानौ जातौ इदमनुपपन्नं यदिभाचिह्नं बदभुजादहिर्भविष्यति
तदा भादहकोणः बदहकोणान्महान् भविष्यति दहजकोणादपि भवि
ष्यति यतः बदहकोणः दहजकोणश्च इमौ समौ स्तः भादहमहान्कोणः
दहभाकोणेन समोऽस्ति दहभाकोणखंडं दहजकोणान्महज्जातं तदिदमनु
पपन्नं यतः खंडं कोणादधिकं न भविष्यतीति तस्मात्भाचिह्नं भुजयोर्मध्य
एव भविष्यति पुनः प्रकारान्तरेण कोणस्यार्द्धीकरणं दबरेखायांभाचिह्नं
कार्यं दभारेखा तुल्यं हबंएयक्कार्यं भाहवदरेखे कार्ये संपातस्तसंज्ञः कल्प
नीयः अतरेखा कार्या इयं अकोणस्य समानं भागद्वयं करोति अत्रोपप
त्तिः भाहद (29*) कोणः वदहकोणश्चैतौ समानौ जातौ दतंहतं समा
नं दअ (*) तत्रिभुजं हअतत्रिभुजं समानं तस्मात् अकोणस्य भाग
द्वयं समानं जातं अथदग्रमत्रैवं १० तत्रयद्रेखायाः समानं भाग इयमपे
क्षितं भवति तदा तद्रेखोपरि समत्रिभुजं कार्यं यथा अबरेखोपरिसमं
त्रिभुजं कृतमस्ति पुनस्तत्र जकोणस्य (30) जदरेखया समानं भागद्वयं
कृत्वा तदाजरेखाअबरेखयाअपि समानं भागद्वयं करिष्यति अत्रोप
पत्तिः अजदत्रिभुजे अजभुजः जदभुजः अजदकोणश्च दजबत्रिभुजस्येन
बजभुजेन जदभुजेन बजदकोणेनच समानःतस्मात् अदंबदंद्वयमपि
समानं तदेवमुपपन्नं रेखया समानं भागद्वयं अथैकादग्रमत्रैवं ११ तत्रैक
रेखायां अभीष्टचिह्नालंबोनिष्काश्यनीयोऽस्ति यथा अबरेखायांजचिह्नं
दत्त्वा तस्मात्लंबोनिष्काशितोऽस्ति तद्यथा अजरेखा (31) यां दचिह्नंदेयं
जदतुल्यं जहंकार्यं दहरेखायां समत्रिभुजं दभाहंकार्यं पुनः भाजरेखा
कार्या इयमेव लम्बः अत्रोपपत्तिः दभाजत्रिभुजस्य भुजत्रयं हभाजस्य
भुजैः समानमस्ति भाजदकोण भाजहकोणौ जचिह्नस्य समानौ तस्मात्
जस्य दौकोणौ समकोणौ जातौ भाजरेखा लंबोजातः तदेवमुपपन्नं चिह्ना
लम्बकरणं पुनः प्रकारांतरेण तत्र अबरेखायां अचिह्नालम्बकरणं चिकी
र्षितमस्ति तत्रअब ॥

* These two figures are wanting; also No. 24.

FIGURES OF THE REKHA GANITA EXTRACT.



Position of the TIDE GAGE at Chittagong.

III.—*Observations of the Tides at Chittagong made in conformity with the Circular of the Asiatic Society. By Lieut* H. Siddons, *Engineers.*

Tide Registry.
Alishuhr Beach, July, 1837.
Times of High water.

[See sketch in Pl. L.]

Date.	1st Tide.	2d Tide.	Date.	1st Tide.	2d Tide.	Moon passes meridian.
1	● Passed	mern. S.	16	11h 06m	23h 63m	or 0 03 of the 17th.
2	0h 37m	13h 15m	17	11 58	0 57	
3	1 3	13 55	18	13 23	1 54	● 1d 23h 31.7m mean time.
4	1 51	14 25	19	14 19	2 45	○ 17 11 58.3
5	2 30	14 57	20	14 57	3 21	● 29 22 45.8
6	2 45	15 12	21	15 21	3 51	
7	3 03	15 35	22	16 27	4 31	
8	3 38	16 04	23	17 17	5 21	
9	4 03	16 43	24	17 51	6 51	
10	4 35	17 38	25	18 42	7 40	
11	6 03	18 48	26	19 43	8 49	
12	7 07	20 17	27	20 54	10 01	
13	8 10	21 10	28	22 11	10 59	
14	9 09	22 06	29	23 15	or a ¼	past 11 A. M. of the 30th.
15	10 03	23 07		Observations stopped by mistake a day too soon.		

All the above are expressed in mean time.

The second tide of the 16th should stand as the first of the 17th, and so on for the remainder.

October, 1837.

Mean Time. ☽ Meridional passage ● 29th Sept. 24h 09m 00s ○ 13th Oct. 11 35 06 ● 28th Oct. 23 31 45

1	2h 10m	14h 12m	There must have been a heavy gale somewhere from the	
2	2 41	14 46	4th to the 8th; the swell here was very great and the	
3	3 13	15 19	times noted so far doubtful on account of the waves.	
4	3 46	15 52	On Wednesday the 4th we had violent squalls of wind and	
5	4 17	16 24	rain; there was no barometer to note the fall, but the	
6	4 50	16 56	atmosphere felt remarkably heavy though chilly.	
7	5 26	17 28		
8	6 32	19 29		
9	9 38	21 40		
10	10 34	22 36		
11	11 44	23 49		
12	....	12 33		
13	0 31	13 19	On the 13th the diff. between day and night flood by Mr.	
14	1 14	14 0	C. W. Mullins was 9 inches, this at the Sudder ghat,	
15	1 47	14 22	Chittagong 12 miles up the river.	
16	2 23	14 53		
17	2 56	15 24	On the 22nd 3 inches,	
18	3 28	15 56	23rd 2½ inches, } According nearly with my own.	
19	3 48	16 02		
20	4 11	16 43		
21	4 49	17 28		
22	5 50	20 40		
23	8 43	21 42		
24	9 46	22 45		
25	10 48	23 35		
36	11 40	....		
27	0 20	12 25		
28	0 50	12 52		
29	1 22	13 21		
30	1 48	13 50		
31	2 05	14 15		
1	2 31	No obs.		
2	No obs.	Ditto.		

	Rise of day Tide.			Diff. btwn. D. & night Tide.		
	Ft.	in.	8th	Ft.	in.	8th
	7	6	0	0	3	4
	8	6	4	0	2	5
	9	7	7	0	7	1
	10	8	3	0	8	5
	11	9	3	0	9	0
	12	10	7	0	9	5
	13	7	2	0	10	6
	13	2	0	1	6	2
	13	2	0	1	8.	3
	11	11	4	1	6	0
	No obs.			1	3	5

These observations were all taken by me at Point Petunga, the mouth of the Chittagong river, where I had gone for change of (and sea) air.

On the 29th there was a diff. between the flood tide at Alishuhr and Point Petunga at the mouth of the river (about 12 miles south) of 15 minutes: the other days were not noted.

IV.—*Translation of a Servitude-Bond granted by a Cultivator over his Family, and of a Deed of Sale of two slaves. By* D. Liston, *Esq. Gorakhpur.*

Some months ago I was requested by Captain Lawrence, under whose charge the survey of the Eastern Division of the district is placed, to furnish answers to statistical inquiries regarding *Sidowa Jobena*, a purguna of *Gorakhpur*, bounding on *Sarun*. I in turn thought of applying for aid in the compilation of the replies to a friend who has been settled as an indigo planter* for several years in *Sidowa*, and who proved to be possessed of a competent acquaintance with the habits and usages of the natives in his neighbourhood.

One of the queries put was, "How do zemindars pay people who water and cultivate lands for them?" The reply was to this effect: "They employ bond servants who are paid at half a cooly's rate, and are at the same time liable to fine in case of absenting themselves from their superior's work." Further inquiry procured me the accompanying bonds or deeds, and as they appear curious and valuable from throwing light on the condition of the agricultural population of this portion of India, I have translated them and now forward them to your address. If you regard them in the same light as I have done perhaps you may think it worth while to publish them in the journal; if you do not think them of sufficient importance for this purpose, pray dispose of them as you may think proper.

The deeds you will observe are blank, but still such as are daily executed and in full force; they were written out by a common village Putwarí, and are in the rustic dialect or *Patois* of the section of the province where he resides. The spelling you will also see is not ordered according to any very uniform system.

Servitude-Bond.

Translation.

Deed.—Abheeman Kooroomee and his children's plough bond for fifty-one rupees written, signed rupees fifty-one, 51.

[Place for the Master's name†.]

Writing.—Abheeman Kooroomee, inhabitant of *Futapoor*, perguna Sidowa Jobena Elaka Sooba Oudes zillah *Gorakhpur*, having received a loan of fifty-one (51) rupees from ‡ (the above mentioned individual), I have granted a bond agreeing to pay interest for the said rupees at eight anas

* Mr. J. Finch of *Bubnowlí*.

† Mr. Finch's name is set down in the original which it is hardly necessary to repeat is fictitious.

‡ Blank in original.

per month; for these same rupees I of my own will and accord execute (this) deed of *Hurwuheebundhee* (to have force) over my whole family, for the driving of a plough and for remaining always at hand to execute every kind of labour that may occur. If I remain absent a day from my plough or work then shall I be held responsible to the extent of a rutee weight of gold for each day's absence. If I go any where in the manner of flight then let my whole family be seized. If any other person give (me) a greater sum, he must pay at once principal and interest of this loan. That man may then take my family. If he do not give the money then may my family be seized without dispute; any other interfering will be in vain indeed. This is written that the first engagement may remain in force.

Written 29th Falgoon, year 1244 forty-four at *Emelia*.

DEED of Sale of two Slaves.

Explanation and Translation.

Dhodho Mahto *Kumkur* of his own will and accord sells Ajunsi'a and *Rupia*, having executed and delivered a "deed of sale of slaves" signed, or a *mofurkutee loonkutee*.

[I do not find the five or six first lines very intelligible but what follows presents no great difficulty].

The deed commences with the invocation, usual in Sanskrit documents, of *Sosti Sri*; the two first lines are taken up nearly with the enumeration of the titles of Vikrama'jit and of Saliva'hun's power. In the fourth line the 43rd year of some king is indicated. Alumgir is then mentioned and the 32nd year of Nawáb Mirza' Amani Beg spoken of. Then follows the year of the rule of the Honorable English Company; viz. the 33rd Mr. Currie being administrator, (local). The locality *Gorakhpur*, south of which runs the *Ganges* and to the north the *Gunduk*. The country *Bharuthkum*, sirkar *Gorakhpur*, sooba *Aoadh*, *Akternuggur*, perguna *Sedooa Jobena*, talooka *Bansgaon*, tuppah *Thadheebaree*. The 25th year (of the rule) of Babu Esri Ku'mar Sah (talookdar), the 22nd year (since the establishment) of the English perguna. Sekh Jumalu'din being foujdar and tehsildar at the tehsildaree of *Peronna*.

In the village of *Buderuha* a sale of slaves was effected. Purchaser Udho Singh; amount 43 *Furakabad* rupees. Seller by name Dhodho Mahto *Kumkur**, of his own will and accord he sells Bulbhader's wife† and son, two adults. The woman's name Ajunsia, the lad's name Rupia, (this) slavery-bond being executed and delivered. The woman's age 22‡, complexion fairish. Rupia's age 28, complexion dark, eyes dark. Of these people Dhodho Mahto *Kumkur* has completed the sale, wherever they go, thence they may be brought back, as slaves they are sold to perform every

* The *Kumkurs* are kuhars or bearers.

† A slave-holder may sell a whole family, or what part of it may suit is convenience.

‡ In the original the word is thirty, the ciphers twenty-two as here.

kind of work; wherever they may flee thence they may be seized and brought back without objection or complaint or murmur, without obstacle may they be brought from under the king's or prince's throne; whoever receives these servants, Hindu or Musalmán he may (legally) be adjured—the Hindu by the sacred cow;—the Musulmán by HUSEN, by the Sekh, Seyd, Mogul, Pytan, Sumbut year 1894, month Jet, dark half 13th day, Sunday, year 1244, place *Buderuha*, two ghurees of the day being spent, this was written and signed.

[We have not thought it necessary to insert a lithograph of the Deeds themselves which are in the ordinary *Kayasthí* or *Kaití* form of Nágari.—ED.]

V.—*Note on the Malay Woodpecker. By Dr.* WILLIAM BLAND, *Surgeon of H. M. S. Wolf.*

In reference to Mr. HODGSON's description of three new species of Woodpecker, in your Journal of February last, and agreeing in his opinion most heartily, that *America* cannot shew specimens of woodpeckers superior, nor even equal to those which are produced in India, allow me to send you for his information and others interested in the ornithology of this country, the description and measurement of a woodpecker, shot at the extreme point of the Malay peninsula, in March last. A specimen, to which even the royal Nipalese bird must yield the palm,—and a beautiful and noble bird it is,—in size, strength, and beauty, was preserved and sent to *Scotland;* but the following description is from my note book.

Body, not including bill nor tail, nine inches long, tail eight inches; bill, very strong and hard; ridges, high and sharp, forming at the tip a complete wedge; breadth at the base 9-10ths of an inch; height 6-10ths, being 1-3rd more in breadth than depth.

Color, back, breast, neck, wings, upper and under coverts of the tail, and tail itself, glossy black; belly and under wing coverts yellow; head crowned with a scarlet erectile crest, and a patch of red feathers behind the under mandible, with a few white speckles on the throat; tail moderately wedged, consisting of ten strong feathers, worn at the tips, and covered with the juices from trees on which the bird feeds; a bare space round the eye; iris bright yellow; tongue four inches long; feet large, strong, and zygodactile, with considerable mobility of the outer toe; spread of wings two feet three inches; weight twelve ounces. His loud tapping on a tree heard at a considerable distance, led to his discovery, and I had named him "*Picus Maximus Malayensis.*"

VI.—*Notes on the Musical Instruments and Agricultural and other Instruments of the Nepalese*. By* A. Campbell, *Esq. M. D. Surgeon attached to the Residency at Katmandhu.*

1.—Musical Instruments.

It is almost unnecessary to allude here to the two chief classes of men forming the population of the valley of *Nepal;* but to save repetition, it may not be amiss to mention, that the instruments underneath enumerated, are common to the Newars and the Parbuttiahs, both designations being understood in the widest sense. This difference, however, exists, in the classes of each tribe using them; among Parbuttiahs none but the lowest castes furnish professional musicians, and there are no amateurs of this science among the rude highlanders, who now rule *Nepal*. The Newars, on the contrary are, as a people, extremely fond of music, and many of the higher and middle castes practise it professionally, and indulge in it as amateurs. Their labors in the field are generally accompanied, and their weary return from it at certain seasons, enlivened by the plaintive strains of the rural flute *(bansuli)*, or the sharper tones of the *mohalli* (flageolet), and at marriages, births, feasts, fairs, and religious processions, a preceding band of music, is an indispensable portion of the smallest ceremony; nor is it uncommon, on a festival day (of which the Newars have nearly 100 annually) to see a joyous jolly fellow, with his flageolet, or cymbals, as the case may be, trudging along towards the scene of rejoicing, piping a national air on the former, for his own amusement and that of all passengers, or drumming with the latter, in unison to his thoughtless but cheering whistle.

As a general rule, however, professional musicians, among the Newars, as with the Parbuttiahs, are from among the lowest castes, *Kúllús* and *Kúsúlliahs*, form the majority from the former, *Damais* and *Sarkis* from the latter.

The instruments used by the people are as follows: I exclude the imitations by the Gorkhas, of British ones, with which their military bands are furnished, the chief of which are the *bagpipe*, made and played on by *Sarkis*. The flute, either English, or imitation of the flageolet, and a variety of horns, trumpets, and bugles.

No. 1.—*Phúnga* (*Newari*), is a trumpet-shaped instrument made of copper, about three and a half feet long, two inches in diameter as its large extremity, and tapering gradually to the mouth-piece, where its bore is diminished to the diameter of $\frac{1}{8}$th of an inch, it is formed of

* The figures refer to models presented by Dr. Campbell and deposited in the museum.—Ed.

three pieces, the one fitting into the other, is of very rude workmanship, and costs only about two Nepalese rupees*. The length of this instrument, and its slender make, require some support, when being used; it is consequently furnished with three pieces of stick, which when fitted into one another, form a rod of four feet in length to which the *Phúnga* is attached, by a bit of ribbon, at its expanded end, the rod crossing the instrument at right angles. The player holding the opposite end of the rod in his right hand elevates the instrument at pleasure, bringing it to the perpendicular when used in a crowd, but carrying it horizontally under other circumstances. The *Phúnga* belongs exclusively to the Newars, is called by them, "the musical instrument of the gods," and is played on at every religious ceremony and at every temple, within the valley, when the setting sun gives the signal for the performance of the evening sacrifice.

No. 2.—The *Mohalli* (*Newari*), or Nepalese flageolet. Is rudely executed, and from the most ordinary materials. Its mouthpiece is nothing more than a bit of palm leaf folded, and cut into a convenient shape! the body of the instrument is made of two pieces of sál wood, bound together by slips of the bambu, and hollowed out longitudinally, apertures or stops, (8 in number) being made for the fingers to play on; its trumpet or dilated extremity, is made of copper, gradually increasing in calibre, from the diameter of an inch to that of four inches at its open termination. The complete instrument costs about two and a half Nepalese rupees. The *mohalli* belongs exclusively to the Newars, and many persons of this tribe use it, who are not professional musicians. Its tones are sharper than those of the *bansuli*, or common Indian flute, and the national tunes adapted to it, are lively and pleasing, even to a British ear. To the Newars it seems to sound magically, for it has the power of inducing the poorest and most fatigued laborers, to join in the dance, and it is the constant accompaniment to their songs of merriment at feasts and weddings.

No. 3.—The *Singha*, or *Nar Singha*, the Nepalese horn. It is made entirely of copper, is when put together in the shape of a cow's horn, and about four feet long, is composed of four pieces, and tapers gradually from its wider extremity, where its calibre is four inches in diameter, to the mouth-piece, where the bore is not more than a quarter of an inch across. The *singha* is used exclusively by the lowest castes among the Parbuttiahs, and is in considerable demand among the lower castes of the plains of India. Its blast is loud, deep, but not musical, and its professors seem unable to mould its tones into

* A Nepalese rupee worth about 12 or 12¼ anas of Company's currency.

any thing like harmony. It is rudely manufactured, and costs about three and a half Nepalese rupees.

No. 4.—The *Nag-phéni*, or *Turi*, a Parbuttiah instrument exclusively. It is only different from the last in being of smaller size and having three vertical turns in its shaft, like a French-horn. Its *noise*, for music it scarce produces, is any thing but harmonious. It is made of sheet copper, tinned over, and costs one rupee eight anas.

No. 5.—The *Bansuli*, "or rural flute" of Sir W. Jones. It is much more like the common English fife in its tones, and is identical with it in form; is used by the Newars and Parbuttiahs.

No. 6.—The *Saringi*. This is the same as the instrument of that name used in India, and represents our European violin, in so far as it is stringed and scraped upon, with a horse-hair bow, but it is at best a miserable instrument. In *Nepal* it is only played on by the lowest caste Parbuttiahs, and by beggar boys, from among whom I have not seen or heard of any Pagamnis. The dancing girls imported from *Benares* annually for the amusement of the durbar, have their accompanying fiddlers; but these being foreigners, are not alluded to here.

No. 7.—The *Sitar*, or three-stringed guitar of India, is used by a very few persons in *Nepal*, whose proficiency is most wretched. Professors of this instrument from the plains of India find some encouragement from the Goorkhas,—at least an occasional performer of tolerable skill may be heard at their court.

No. 8.—Cymbals of various size, from that of a teacup, to the dimensions of a wash-hand basin, are used by the Newars and Parbuttiahs, to the same extent as in Hindustan; all religious ceremonies requiring music, all Jattras, or processions of the gods, as well as of marrying, and feasting mortals, are accompanied by the discordant noise of these untuned instruments. They are made of mixed metals, the chief of which is denominated *Phúlia*, and is composed of zinc, copper, and tin, in various proportions, according to the tone intended for the cymbal.

No. 9.—*Múrilli* of the Parbuttiahs, *Beaugh* of the Newars, is a small clarionet, about nine inches long, with eight stops, made of a single piece of bambu, the mouth-piece being formed by blocking up one end of the canal with a bit of wood, except a small slit through which the air is breathed. The tone of this instrument is sweet, and the airs played on it pleasing and plaintive. It costs about eight anas.

No. 10.—*Dhol* (drum). The same as the Hindustani one, except in the greater length of barrel, in one of the varieties.

No. 11.—*Dholuck*, differs from the *dhol* in having one end only covered with leather, and played on, is used by the Parbuttiahs but not commonly; a nearly similar drum, is used by the Newars, and called by them *dishi*.

No. 12.—*Beh* (*Newari*), commonly called *Krishna-beh*. Is the pastoral flute of that god (Krishna) so celebrated in history, and so famous in his loves,—is a common reed, with a spoon-shaped shield at the mouth stop: has seven stops along its shaft.

Specimens of these instruments were deposited in the museum of the Asiatic Society of Bengal in January last. I do not feel at present competent to give any correct account of the state of the science of music among the Nepalese. In general it may be stated that the Newars are capable of forming bands, containing performers on all the instruments above enumerated, whose music is far from discordant although of the simplest construction. The orchestra attendant on a Hindu play enacted here last year was upwards of 50 strong, and in some of the melodramatic portions of the performance, the tunes were not only enlivening and harmonious, but of a highly inspiriting caste. The Nepalese have no written music, so far as I have been able to ascertain. Among the numerous volumes of Sanskrit literature, collected by Mr. Hodgson in *Nepal*, he informs me there is a very large one of the scenic, and musical acts, which he infers must have flourished very considerably in union with each other, previous to the Goorkha conquest of the valley. In these works the musical science is deemed of sacred origin. The Nepalese music is most probably identical with that of the plains, the Hindu portion of which is traced to the same fountain.

2.—Agricultural and other Implements.

No. 1.—The sugarcane mill or press, called *túsá* by the Newars, and *koulá* by the Parbuttiahs. It is of very rude and simple construction, but efficient enough for its purpose, among a people who are as yet content to go without the aid of horses and bullocks in the labours of husbandry and mercantile transport. The sugarcane grown in the valley, is for the most part, a small slender species of this plant, which ripens in the months of December and January, when its juice is expressed and evaporated to the semi-crystallised form of *gár*, being scarcely further treated by the Newars than to the attainment of this coarse saccharine matter. All the *chiní* (soft sugar), and *misrí* (candy sugar), used in *Nepal* and its neighbouring portions of *Thibet*, is imported from the plains of Hindustan.

The *tásá* stands in the open air, either at the house of the cane-grower, or more commonly in the field, where a small shed is erected for covering the evaporating boiler, and storing the jars of *gúr*. It is formed as follows:—Two rough and strong posts $2\frac{1}{2}$ feet apart, of any common wood, are sunk in the earth, to such depth as will secure their fixedness under the heavy strain of the squeezing lever; these posts, which stand about six feet above the surface, are connected by two horizontal beams, of considerable strength, the lower one being about two feet from the ground. In front of these upright and horizontal beams, and at about three feet distance, two other posts of three feet above the surface are sunk, the space between them being occupied by the shorter limb of the squeezing lever which plays on a wooden axle, passing through the shorter limb, and the smaller posts. On the top of the smaller posts, and on the lower one of the beams which connect the larger posts, is laid a thick plank of heavy wood $2\frac{1}{2}$ feet broad, and about six feet long, its surface being grooved transversely at one end, and having a channel cut along the sides, for carrying off the expressed juice, towards the opposite termination of it, which is perforated and lies immediately over an earthen vessel sunk in the ground for the collection of the fluid. Over the grooved end of the lower plank, and under the upper beam which connects the larger posts, a thick plank about two feet long is laid, which forms in fact the upper *millstone*. The sugarcane being cut into pieces of a foot long is placed between these thick planks, the upper one being pulled down by the depression of the longer limb of the lever; the upper plank and the shorter limb of the lever connected by a strong rope or strap of leather. The lever is precisely the same as that used in *Behar* for emptying wells, without the addition of a weight at the extremity of the longer limb, and a rope for depressing it. The Newar sugarcane-squeezer is content to climb up to the elevated limb and by the weight of his body in the air and strength of his arms when he reaches the ground, to depress it.

The sugarcane juice is evaporated in common earthen vessels until it assumes the proper thickness, when with scarce any purification it is stored up for use. The dry juiceless cane is used as fuel by the poorer natives.

No. 2.—*Chíkou-sá*, the oil-press of the Newars. This machine is even more rude than the former, being actually little more than two logs of wood so placed as to be capable of being separated, for a small space at one end, and again approximated, without any mechanical aid save the very poorest. The *sármi* (oil-maker) builds a house for his

press, and, like the Scottish miller, has frequently an allotted district, from which grist comes to his mill exclusively. He sometimes purchases oil seeds, and becomes a large dealer in the article, but most commonly he depends for his sustenance, on the payment by the small farmers, of a portion of the oil, from that made at his mill, which he converts into money. The machine is made and worked as follows :—Two strong wooden posts (of which about three feet are above the surface) are driven at three feet asunder into the earthen floor of the press-house and connected by a horizontal beam, under which, and over a moveable log lying on the ground, one end of the logs forming the *press* proper are placed. The logs, each about 16 feet long and 18 inches in breadth and depth, are laid parallel to one another, secured at one extremity as above mentioned, the opposite one from the operator being free and admitting of being separated to the extent of eight or ten inches for the introduction of the oil-furnishing seeds. The apparatus for forcibly bringing in contact the logs separated for the introduction of the grain consists of first, a stone pillar sunk in the ground, against which one of the logs rests; second, a strong rope encircling the stone pillar and passed underneath and over both logs through which the end of a long wooden lever is passed, by the depression of which the logs are approximated; third, a rude stair on which the oil-pressers ascend to grasp the end of the lever and from which they depress it, until the ground comes within reach of their footing; and fourth, a wooden peg passed through the lower part of the stair, for the purpose of holding down the depressed lever until the oil ceases to drop from the expressed seeds. The seeds (mustard is the chief) having previously been pounded in a large wooden mortar, and toasted on a large stone kept hot by a subincumbent fire, both being in the same house with the oil-press, are put (to the extent of eight or ten pounds) into a bambu wicker basket, which is introduced between the large horizontal logs. This being accomplished the operators, two or three in number, ascend the rustic staircase, and seizing hold of the erected extremity of the lever, hang by and pull it by turns, until their united efforts succeed in depressing it, when a portion of oil is obtained. An earthen vessel lying on the ground receives the oil as furnished. The Newars know not the superiority of cold drawn, over hot drawn oil, or at all events, do not manufacture the former. The oil seeds are generally three times pounded, and toasted, and as often put into the press; when thoroughly exsiccated, they are carried home and given (as in Europe) to cattle, as well as to poultry. The Newar women use this oil-cake, or oil grains, in

washing their hair, in the same way as the females of Hindustan employ the *aulah*.

No. 3.—The water-mill, *Pan-chuki* of the northern Doab and western hills, *kan* of the Newars,—is so well described in the 19th number of the Journal of the Asiatic Society, as used in the Doab, that I shall only notice the slight points in which the *Nepal* one differs from the other. Of the Doab one it is said, "a horizontal water-wheel with floats placed obliquely so as to receive a stream of water from a shoot or funnel, the said float boards being fixed in a vertical axle passing through the lower millstone, and held to the upper one by a short iron bar at right angles, causing it to revolve with the water-wheel ;—*the axle itself having a pivot working on a piece of the hardest stone that can be procured from the shingle near at hand* :—this, with a thatched roof over it, and the expense and trouble of digging a cut, so as to take advantage of a fall of water, are the only articles required in this very simple mill." This description is correct for the *Nepal* mill, with the exception of the contrivance for a pivot on which the axle turns, and that for a cup for the reception of the said pivot. Instead of a rounded *pebble* being sunk into the lower end of the arbor, and a larger stone being embedded in the horizontal beam, or transom, on which the pivot revolves, we have in the *Nepal* one, an *iron* pivot driven into the nave of the water-wheel, and a square piece of the same metal sunk into the transom, and its upper surface hollowed out for the pivot to revolve in. In all essential respects they are the same, and alike rude in construction. On this point I am enabled to speak from personal observation, as I have had many opportunities of examining the water-mills of the *Dehra Dhoon*, and western hills, as well as those of the valley of *Nepal*.

The water-mill does not supersede in *Nepal* the use of the common hand-mill, as the latter is to be found in almost every cultivator's house, and exactly similar to the one used in the plains of India; viz. nothing more than a couple of circular stones, about 18 inches in diameter, the superior one resting on a pivot fixed in the lower one and having a peg of wood driven into it, by means of which it is made to revolve on the other as it lies on the ground. Mr. Elphinstone found the water-mill with a horizontal water-wheel immediately below the millstone in general use beyond the Indus, and says that it "is used all over *Affghanistan*, *Persia* and *Turkistan*." Throughout the hills from the *Sutlege* to the *Mitcher* or eastern limits of *Nepal*, its use is general, and has been so in all probability for a long period of time. More recently this kind of water-mill has been introduced into our

territories in the northern *Doab*, which lie along the upper *Jumna*, and so great is its simplicity, adapting it to the appliances of the most ignorant natives, "that it has been adopted generally in all the canals in the *Delhi* district, as well as in those of the *Doab**."

A similar mill is said to be used in some of the most northern of the *Scottish* islands, as well in *Provence* and *Dauphiny*.

The power of the *Nepal* mill is not by any means great, nor is there much inducement for the improving of it beyond its present state. Wheat in *Nepal* holds a very low place among the farinacea in comparison with rice, in consequence of the better adaptation of the soil for the latter grain; and so small is the consumption of *atta* (meal) that the miller cannot depend on his craft, as an only means of subsistance†. As an average of the power of these mills, the produce of one after 24 hours' grinding ranges from 7 to 10 *muris* of meal, (14 to 20 maunds about,) the latter quantity being considered the maximum produce of the best.

The earnings of the miller are for the most part in kind, and the rate of payment varies according to the supply of water at the time of grinding, as well as with the quantity of grain brought by an individual. The highest rate for grinding is an $\frac{1}{8}$th of the produce, the average one is $\frac{1}{10}$th, and the lowest $\frac{1}{14}$th, this being for grinding alone, as the proprietor of the grain transports it to, and from, the mill.

The payment in kind for grinding corn is, I believe, universal in the hills, it is customary in the *Delhi* territory of India, and I can vouch for its being the invariable mode throughout a large portion of the highlands of Scotland. The rate of renumeration in the latter country was in 1827 $\frac{1}{16}$th for grinding oaten meal, $\frac{1}{10}$th for grinding barley meal, and $\frac{1}{20}$th for grinding malt, which had paid duty; a good deal more for the smuggled article, as an indemnification to the miller for the risk run in admitting the contraband to his premises.

No. 4.—*Kú, (Newari;) kodali* of the Parbuttiahs. The hoe or spade with which the Newars turn up the soil of their fields. They do not use the plough, and compared with the Indian one (which is used by the Parbattiahs), this spade is a much more efficient instrument. Its cut is from 4 to 6 inches deep. The Newars use it with dexterity and delve a field in surprisingly short space of time, turning the earth up in ridges, or narrow beds. The *kú* resembles our

* See Journal Asiatic Society, No. 19.

† *Murwa, kodu*, Indian corn, and a little rice is ground by these mills besides wheat; the ground rice is used for making sweetmeats.

adze, more than a spade, but differs from the former in having its handle projecting from the off side of the neck of the instrument. The delver holds the handle in both hands, and stooping forward raises the spade at each cut above his head, bringing it down strongly and steadily and cutting the sod rather slantingly, can make a furrow in well moistened ground of 9 inches deep. The ground for both crops of rice and for wheat, has two or three delvings. So soon as one crop is off the ground the Newar turns up his field for another one, thus gaining all the advantage from the decaying stubble, which early ploughing can give*. This immediate turning up of the soil is a matter on which the Newars lay much stress, and consequently it is very common to see the women and children of the family cutting down wheat and rice, at one end of a field, while the males are delving it from the other. The *kú* costs about one current rupee.

No. 5.—*Kurmúghan, (Newari.)* The wooden crutch-like instrument used by the Newars for breaking down the clods, and preparing the soil for receiving seed. With this they reduce the earth to the finest powder; it is all they have for serving the purpose of our iron rakes and harrows, nor is it inferior to them in the hands of the very hard-working and skilful husbandmen who use it.

No. 6.—*Kúchi-múghán, (Newari.)* The instrument used for covering over sown wheat, and *gayha* or upland rice, is a block with an upright shaft, used like a pavier's block. The *gayha* variety of rice is suited to dryish lands, is not transplanted, but laid down in seed, most carefully and laboriously, with the fingers. When sown thus, the ground is beaten down gently with the *kúchi-múghán.*

No. 7.—*Chassú-múghán, (Newari.)* A thin-edged wooden shovel, used for smoothing the flooded beds in which the seed of the *malsi*, and *tóli* varieties of rice is sown, for the purpose of furnishing transplants or seedlings. It is also used in the suburban fields, devoted generally by the Newars to the raising of culinary vegetables, pepper (red), ginger, &c. &c. where it is necessary to prepare the soil carefully and finely.

No 8.—*Kúkítcha, (Newari.)* A small broad-pointed hoe, used by the Newars, for weeding the flooded rice.

No. 9.—*Chong-kúki, (Newari.)* A sharp-pointed hoe, used in weeding the gayha or dry land rice, *úrid* (a vetch), and other drill crops.

N. B. Nos. 8 and 9 are iron instruments, with wooden handles.

* Sir Humphrey Davy, proved chemically the advantages of using vegetable manures *fresh*, and the practice is now general in England.—*See his Lectures on Agricultural Chemistry.*

No. 10.—*Kúe, (Newari.)* A clumsy wooden shovel, used for spreading grain to the sun and collecting it in heaps after its removal from the straw. The Newars do not use the flail in threshing their corn ; there are two modes in use ; in separating the *malsi* rice from its straw, nothing is required beyond the shaking of the sheaf, and a few knocks on the ground, in consequence of the preparatory treatment undergone by this crop (or a great part of it). After being cut down it is stacked on the field and left to become heated, and to ferment for 6 or 8 days, after which the stacks are pulled to pieces, and the grain separated from the straw, winnowed by being shaken to the wind from a shallow platter made of mat and bambu and dried in the sun. The grain thus treated is called *hukwa*, and is much liked. The other mode, and the one employed at the wheat, vetch, and gayha rice harvest, is simply beating out the grain with a long stick, as it lies on the ground. All the grain in the valley is separated from the straw on the field, and carried home after being winnowed, in bags and baskets, carried banghywise or suspended from a stick, borne on the shoulders. The crops are reaped with the sickle, which instrument is similar to the European scythe sickle but smaller. The Parbuttiahs, in common with the Newars, use this instrument and rarely pull up the crops by the root, as is the practice of the Plains.

No. 11.—*Lusi-doh, (Newari.)* The large wooden pestle and mortar, universally used in India, for husking grain. A block of hard wood three feet long and 15 or 18 inches in diameter, shaped rudely like an hour-glass, and hollowed from one end down to the middle, is all that is required to form the mortar. The pestle is about four feet long, rounded for about a foot in the middle, and squared on three sides at both ends ; it is used by one or two persons, the centre portion held in the hand, and either end employed for beating the contents of the mortar. This machine is employed principally in *Nepal* for making *chúra*, or the bruised rice, so much eaten in all rice countries of India, when the people are travelling, or from other causes unable to procure time or fuel for regular cooking. The *chúra* is made thus : the rice in husk (*dhan*) being steeped in water for a day and night is toasted for a short time on a stone or large tile heated for the purpose; when thus parboiled, and while still soft, it is thrown into the wooden mortar and bruised into thin flat flakes, in which state, having previously been separated from the husks and dried, it is sold in the shops, and eaten by the people. A native of *Nepal*, or of *Bengal* and *Behar*, will be satisfied to live on this substance alone for many days together : a small quantity of *sukur* (unpurified parti-

ally crystallised sugar) added, gives it a most grateful relish, to the rarely stimulated palates of these poor and primitive people.

No. 12.—*Kúti, (Newari.)* The machine for converting the *dhan* into eatable rice, by husking it, is the same as that for making *súrki* from bricks, (hence called the *Dhenki ?)*

No. 13.—*Chan-kummú, (Newari.)* Is the banghy used in all field work, and consists merely of two small wicker baskets, suspended from either end of a piece of wood or bambu, four feet long, which the carrier bears on his shoulders.

N. B. Exact models in wood of the above noted implements, are deposited in the museum of the Asiatic Society of Bengal.

VII.—*Note on the Facsimiles of the various Inscriptions on the ancient column at Allahabad, retaken by Captain* Edward Smith, *Engineers. By* James Prinsep, *Sec. As. Soc. &c. &c.*

[Submitted at the Meeting of the 6th December.]

Captain Edward Smith, of the engineers, has rendered another signal service to the Society and to all those whose study is directed to the development of Indian history. On this occasion his task has been infinitely more trying to the patience, and has demanded more ingenuity and care, than in the comparatively simple affair of *Bhilsa*; while on the other hand there was less expected from its accomplishment; seeing that Lieutenant Burt had already taken down the two principal inscriptions by hand, one of which had been published and interpreted with the advantage of all the learning and critical acumen of Captain Troyer and of Dr. Mill himself: while the other and older text had been shewn to be identical with the four tablets of the *Feroz lát*, and was therefore included in the explanation of that monument recently given. Nevertheless, experience rife and frequent had taught me the value of a strict revision, even of the most trust-worthy labour of the treacherous eye; and I was equally surprised and pleased to find that Captain Smith had devoted himself to this unpromising labour. There were many discrepancies of letters in Lieutenant Burt's copy of the No. 1. inscription, which might be satisfactorily rectified; there were also many obscurities in the *Samudragupta* inscription, which might be cleared up; and above all, it was an object to determine the nature of the interlineary inscription to which the attention of the curious had been directed first by Lieut. Kittoe,

and which was subsequently confirmed by Mr. Walter Ewer's inspection, as reported to the Society by himself more than a year ago.

To perform the operation in the most complete and engineer-like manner, Captain Smith divided off the written part of the column into six lengths, and each of these again longitudinally into four quadrantal subdivisions, so that the whole surface of the stone could be printed off upon twenty-four large sheets of paper or cloth. Each paper was made to extend somewhat beyond the actual limit of the compartment so as remove any uncertainty in regard to the letters near the edge.

"On the system followed at *Bhilsa*," writes the author, "I have taken off no fewer than three impressions, that the success of one may supply parts of less happy execution in another. One impress is on cloth, and two are on paper, and together I think they give the inscription as perfectly as any inspection of the stone itself: more distinctly indeed I may say, for the relief of the colored ink brings out the characters with a precision not perceptible on the pillar."

Of these one paper and one cloth impression have been transmitted to *Calcutta*, the third being reserved in case of accident to them on the road. When united together the lettered surface measures nearly thirty feet long by nine in width, and comprehends a written superficies of 160 square feet!

Upon their arrival in Calcutta I lost no time in unfolding the roll and connecting the whole of the paper series (which seemed to have received the strongest print) into a continuous sheet, an operation rendered extremely easy by the tickets and directions accompanying them.

Our former review of the sculptured surface of the *Allahabad* pillar had divided the Hindu writing into three heads, that in the ancient or No. 1 character then unknown; that in the No. 2 or *Gaya* alphabet; and a third in the modern Deva-nágarí, consisting of a multifarious and uninteresting collection of scribblings and names. The same classification may still be retained, although we may now conveniently exchange the numerical designations for specific names, more especially as there will be presently shewn to be an intermediate class of writing between Nos. 1 and 2; of which similar evidence was furnished among the *Bhilsa* fragments.

Commencing then my inspection with the ancient Buddhist character (No. 1), I had the satisfaction to find that most of the slight discrepancies before remarked, between Lieut. Burt's version and the published *Delhí* text, disappeared on a careful scrutiny. The few instances of preferable reading or correction of the *Feroz* record which did

occur, I have collected as emendata in the subjoined note*. To a few of them I must however take the liberty of alluding more particularly.

In the first place, it is evident, although it escaped my notice before, that the final è of many words is the representative of the Sanskrit *visarga*, and not solely of the seventh case as I had imagined, or of the plural as in the Hindustáni. Thus in the opening words, *Devánampiyè Piyadasí* represent the Sanskrit देवानांप्रियः प्रियदर्शिः the *yè* and *sè* stand for यः and सः and consequently govern singular verbs, as, *yè cha sampatipajisati sè sukatam kachhati: yè patibhogam no éti* :—&c. Again in the catalogue of birds and animals prohibited from being eaten we find that all those ending in è agree with the Sanskrit masculine nominatives as *sukè*, *arunè*, *chakaváké*, &c. while *sáriká*, *jatuká*, *ajaká*, *eḍaká*, are agreeably to Sanskrit analogy feminines. Attention to this circumstance may help to determine some of the doubtful animals; thus *arunè* (not *arane* wild) is most probably the अरुणः of Sanskrit poetry, the fabulous elder brother of *garuda* the bird of Vishnu: the pandits say it is the adjutant. Again the *Allahabad* text has *anaṭhika-machhè*, valueless fish; and *sankuja*† *machhè*, shell-born fish; therefore it is plain the paragraph is not restricted to the feathered tribes; and, removing this restriction, we find much more plausible translations for many of the words:—*duḍí* (not *daḍí*) दुडिः a small or

* *Corrections or variations observed in comparing the Allahabad facsimile with the published Delhi text.*

North Compartment, line 5 for *usihéná* and *chakho*, read *usáhéna* and *chukho*.
6 for *vadhisatichevi*, read *vadhisati cha, vá*.
7 for *anuvidhiyanti*, read *anu vi dhiyanti*.
12 for *chakho*, read *chakhu*.
13 for *vividha*, read *vividhé*.
14 for *dákhináyè*, read *dakhináyé*.
15, 16 for *heva, chiran thiti*, and *hotutiti*, read *hevam, chirathiti hotúti*.
18 for *pápam pápé*, read *pápakam pápakè*, and for *lája* and *aháj*, read *lájá* and *áhá* passim.

West Compartment, line 17 for *payihanti*, read *payisanti*.

South Compartment, line 2 for *sáyatha*, read *se yathá*.
3 for *arané*, read *arunè*.
4 for *jatuká ambaka pilika daḍi*, read *játúka ambáki pilikà duḍí*.
5 for *sakujámavé*, read *sankuja machhé*.

East Compartment, line 4 for *hetavakhéti*, read *hita sukhèti*
6 for *héméva*, read *hévam mé vá*.
9 for *mokhyamate*, read *mokhyamuti*.

† It is doubtful whether the *j* has not a vowel *e* also, which would make *it shell-fish*, and other fish.

female tortoise (Wilson's Dict.)—*ambáka píliká*, the mother (or queen) ant:—the *panasè*, monkey; *kaḍhata-sayake*, the crab, the boa; *sesimalé*, the snake, the eel. (?)*

It would be endless to enumerate the instances wherein this simple emendation restores sense to passages that were before only half intelligible. I had indeed before adopted it in many cases (as *etam janè sutá*, एतं जनः श्रुत्वा, page 599), but without apprehending the invariable rule. The *Páli* language converts the *visarga* of the nominatives of such nouns into *o*, and the same change is observed in the *Sindhí* and *Zend*†; nor am I aware that the grammatical *Prákrit* or *Mágadhí* of the Hindu drama sanctions the use of the vowel *è* in place of the *visarga*. If *se*, *ye*, *te* are used at all it is either in the dual, or in the plural sense as in Sanskrit, and as in the modern *Hindí Bhásha*.

The next remark I would make is on the singular passage *nomina pápaṃ dekhati, iyam mè pápèkaṭèti* (p. 577). The words on the *Allahabad* pillar are *pápakaṃ* and *pápakè*; of precisely the same meaning, and therefore establishing the correctness of the translation. The same confirmation of authenticity is deducible from the occasional omission of the verb *huti*, the final *iti*, the substitution of *chakhu* for *chakho* and other minor variations. I have inserted in the annexed plate a few examples of disputed passages, commencing with *hidata pálaté dusampaṭipádayé*, which terminates the first long line of the *Allahabad* pillar, a sure sign that the sense is there completed, since we have a similar completion of the sentence in almost every line, as may be seen by reference to the original lithograph in vol. III. which I have not thought it worth while to recopy entire.

The five short lines in the old character that follow the *Dharmalipi* at a short distance below (see Capt. Burt's lithograph) were the next object of my inspection, I have represented what remains of them faithfully in fig. 1, of Pl. LVI. which will be seen to differ considerably from Lieut. Burt's copy of the same. The reading is now complete and satisfactory in lines 1, 2, and 5. The 3rd and 4th lines are slightly effaced on the right hand. We can also now construe them intelligibly, though in truth the subject seems of a trivial nature to be so gravely set forth.

Devánampíyasá váchanèna savata mahámátá
Vataviyá: Ehèta dutiyáye deviye ránè
Ambávaḍika vá alameva dánam: Ehevapaṭi....

* अम्बक पीलका, पनसः कर्कटः, सयकः, शशः मल्लः. The latter word however more nearly resembles सिसुमारः the porpoise.

† Is the similarity of these two names more than accidental?

Kichhiganiya titiyè deviyè senáni sava. . . .
Dutiyáyè deviyèti tí valamátu káruvákiyè

'By the mandate of DEVANAMPIYA, at all times the great truth (*Mahámátá**) is appointed to be spoken. These also, (namely) mango-trees and other things are the gift of the second princess (his) queen†. And these for ..... of KICHHIGANI' the third princess, the general (daughter's..... ?) Of the second lady thus let the act redound with triple force‡,

Unable to complete the sentence regarding the third queen, it is impossible to guess why the second was to enjoy so engrossing a share of the credit of their joint munificence, unless she did the whole in the name and on the behalf of them all!—It will be interesting to inquire whether by any good chance the name of queen *Kichhiganí* is to be found in the preserved records of ASOKA's reign, which are so circumstantial in many particulars. It is evident the Buddhist monarch enjoyed a plurality of wives after his conversion, and that they shared in his religious zeal.

As for the interlineation, it may be dismissed with a very few words. Instead of being a paraphrase or translation of the ancient text as from its situation had been conjectured, it is merely a series of unconnected scribblings of various dates, cut in most likely by the attendants on the pillar as a pretext for exacting a few rupees from visitors,—and while it was in a recumbent position. In the specimen of a line or two in plate LVI. the date *Samvat* 1413 is seen along with the names of *Gopála putra, Dhanara Singh* and others undecipherable. In plate LV. also may be seen a *Bengálí* name with *Nágarí* date 1464 and a bottle-looking symbol; and another below संवत १६६१ धमराज *Samvat* 1661 *Dhama rája*. These may be taken as samples of the rest which it would be quite waste of time to examine.

It is a singular fact that the periods at which the pillar has been overthrown can be thus determined with nearly as much certainty from this desultory writing, as can the epochs of its being re-erected from the more formal inscriptions recording the latter event. Thus, that it was overthrown, sometime after its first erection as a *Silasthambha* or religious monument by order of the great ASOKA in the

* See page 574. In Sanskrit देवानांप्रियस्य वचनेन (or perhaps rather वाञ्छनेन by his desiring, wishing) सर्वतो महामात्रा वक्तव्या (fit or proper to be said,) meaning perhaps that this object had been provided for by pecuniary endowment.

† तदेतत् द्वितीयाया देव्या राज्ञा आम्रवणिका वा अन्यं एव दानम्

‡ द्वितीयाया देव्या तृतीयवल्लभस्तु कारुवाक्य, corresponding as nearly as the construction of the two languages will allow.

third century before Christ, is proved by the longitudinal or random insertion of several names (of visitors?) in a character intermediate between No. 1. and No. 2. in which the *m*, *b*, &c. retain the old form, as in the Gujerat grants dated in the third century of the *Samvat*. Of these I have selected all I can find on the pillar :—they are easily read as far as they go. Thus No. 7, under the old inscription in Plate LVI. is नाडस *narasa*. It was read as *Bahu tatè* in the former copy. No. 8 is nearly effaced: No. 9 may be *Malavaḍi ro liṭhakaṇḍar* (?) *prathama dharah*. The first depositor of something? No. 10, is a name of little repute: गणिकाकस्य *ganikákasya*, 'of the patron of harlots.' No. 11 is clearly नारायण *Narayana*. No. 12, चन्द्र भट *Chandra Bhaṭ*. No. 13 appears to be *halachha seramal*. And No. 14 is not legible though decidedly in the same type.

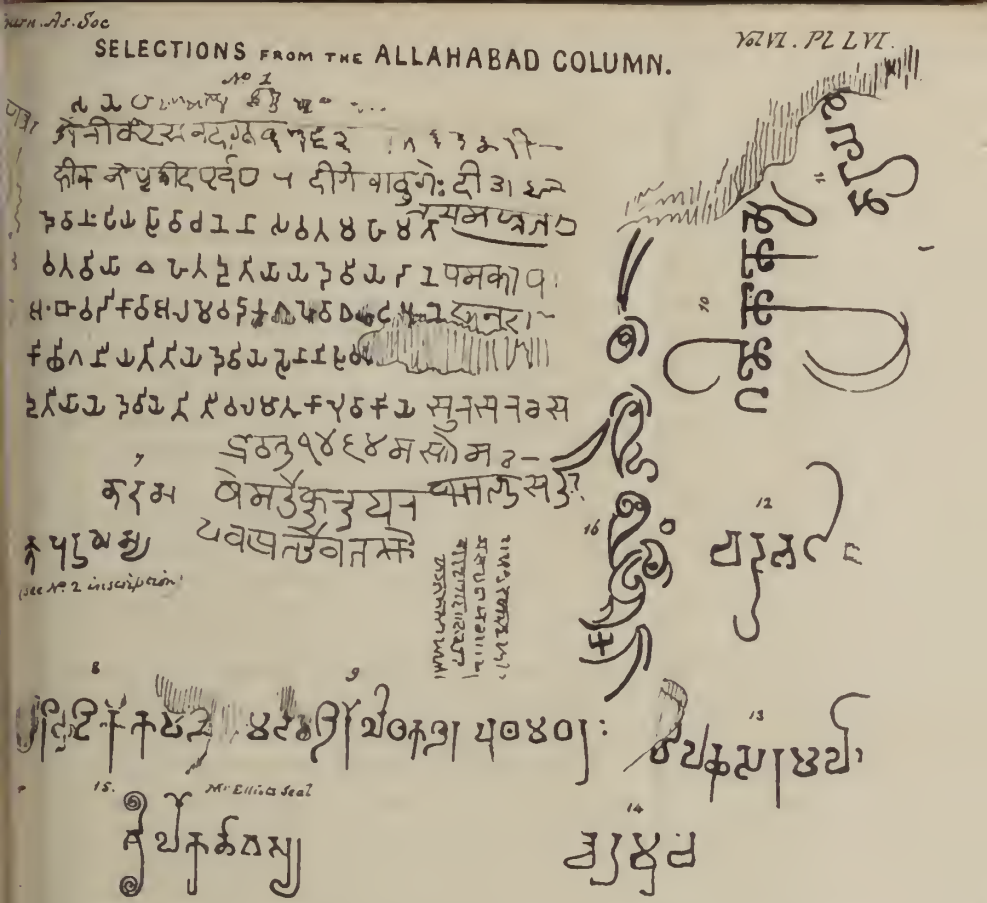
Now it would have been exceedingly inconvenient if not impossible to have cut the name, No. 10, up and down at right angles to the other writing while the pillar was erect, to say nothing of the place being out of reach, unless a scaffold were erected on purpose, which would hardly be the case since the object of an ambitious visitor would be defeated by placing his name out of sight and in an unreadable position.

This epoch seems to have been prolific of such brief records: it had become the fashion apparently to use seals and mottos; for almost all (certainly all the most perfect) yet discovered have legends in this very character. One in possession of Mr. B. Elliott of *Patna*, has the legend lithographed as fig. 15, which may be read श्रीलोक नावस्य *Sri Lokanávasya, quasi* 'the boatman of the world.' General Ventura has also brought down with him some beautiful specimens of seals of the same age, which I shall take an early opportunity of engraving and describing.

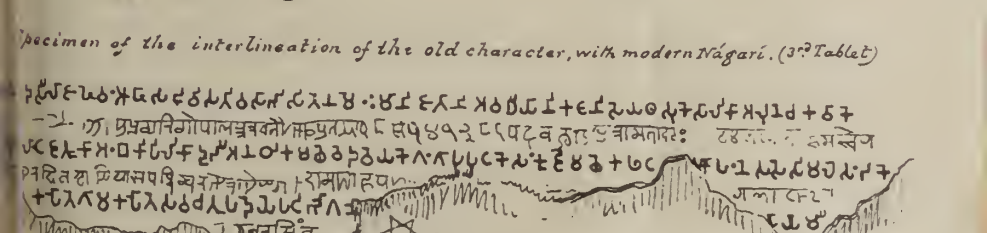
But to return from this digression. The pillar was re-erected as '*Samudra gupta's* arm' in the fourth or fifth century, and there it probably remained until overthrown again by the idol-breaking zeal of the Musalmáns: for we find no writings on it of the *Pála* or *Sárnáth* type, (i. e. the tenth century), but a quantity appear with plain legible dates from the Samvat year 1420, (A. D. 1363) down to 1660, odd: and it is remarkable that these occupy one side of the shaft, or that which was uppermost when the pillar was in a prostrate position. There it lay, then, until the death of the Emperor Akber; immediately after which it was once more set up to commemorate the accession (and the genealogical descent) of his son Jehangir.

A few detached and ill executed *Nagari* names, with *Samvat* dates of 1800, odd, shew that even since it was laid on the ground again by

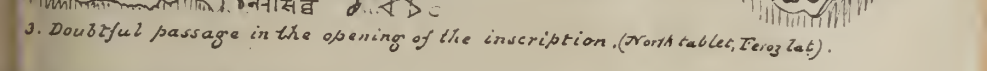
SELECTIONS FROM THE ALLAHABAD COLUMN.



Specimen of the interlineation of the old character, with modern Nágarí. (3rd Tablet)

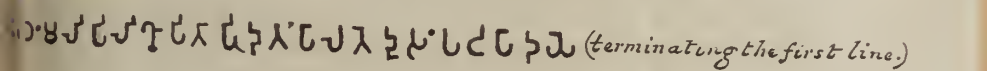


3. Doubtful passage in the opening of the inscription. (North tablet, Terai lat).



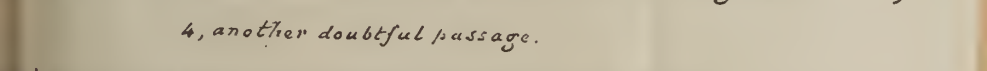
(terminating the first line.)

4, another doubtful passage.



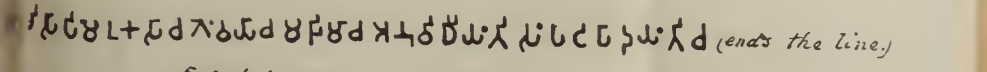
(ends the line.)

5, end of second paragraph, Tal. I.



(ends.)

6, beginning of 3rd Paragraph.



(ends)

general Garstin, the passion for recording visits of piety or curiosity has been at work, and will only end with the approaching re-establishment of the pillar in its perpendicular pride under the auspices of the British government. The welcome order has I believe at last been given to Captain Smith, and there can be little presumption in attributing it to the urgent representations of the Asiatic Society.

The anomalous flourish (No 16) which I before mistook for a peculiar writing, is apparently merely a series of ill drawn *shanks* or shells, a common Buddhist emblem. One was depicted last month, found by Captain Burnes on a Buddhist sculpture at *Hund* near *Attock*.

Let us now turn our attention to the *Samudra gupta* inscription (No. 2.) and see what new light Capt. Smith's labours have thrown upon it:—and here I most sincerely regret that I can no longer make over this portion of my task to my friend Dr. Mill himself, that we might benefit by the critical acumen with which he would test the numerous alterations suggested or necessitated in the former version by the infallible text now placed in our hands. I must solicit every indulgence for having ventured to undertake the examination myself.

I began by comparing the whole document, letter for letter, with Lieut. Burt's original lithograph and with Dr. Mill's transcript having the Latin interlineation, in the third volume of the Journal;—but so numerous were the changes required, that I soon found it indispensable to recopy the original on lithographic paper, and thus to present a fresh edition exactly as it stands on the column, shewing where the stone is peeled off or cut away by other writing, and where the real commencement and termination of some lines can be positively depended on.

First, then, there have been not less than *five* lines erased at the upper part of the inscription. One or two letters in each line can be still readily distinguished by their peculiar form in the midst of the modern *Nágarí* cut upon the excided parts. No conjecture can be made as to the contents of this portion, but Dr. Mill will doubtless be happy to find that the fragment in the fifth line (the first of the former version) will no longer require the strange interpretation of *ursumque lupus aureus in silvâ*, which the Burt copy constrained him to adopt.

In the next place, contrary to Dr. Mill's expectation, the whole of the upper or broken part of the inscription containing ten lines, besides perhaps six erased, proves to be metrical.

The poetical measure is variable: the greater portion is in the *srag-*

dhara chhandah, as lines 2, 3; 6, 7; 12 and 13; lines 8, 9 are in the *mandákrántá* measure; and lines 10, 11 in the *sárdúla vikrírita*; and again at the conclusion of the eulogy, line 28 contains a complete half verse in the *prithví chhandah*, laudatory of the purifying powers of Ganges water.

Each line contains half a stanza, or two *charanas*. The termination of the first *charana* is well defined by a blank space on the stone. The second *páda* or versicle of the stanza is generally erased or unintelligible—but in the 3rd and 4th lines* this also is entire.

From line 14 the composition continues uninterrupted in a florid style of prose or *gadya*.

As it generally happens that the construction of each *pada* is finite and independent, the mutilation of the poetical part does not necessarily prevent the understanding of the general purport, and it is evident that the verse was no less a string of high flown panegyrical descriptions of the prince lately defunct, namely Samudra Gupta, than the prose continuation; with the sole difference that the latter, governed by the initial demonstrative pronoun *tasya*, 'of him,' is constantly in the genitive case—until the sense is completed in the words *babhuva báhur ayam uchchritas stambhas*, 'this lofty pillar,' has become the arm; and then follows *yasya*, 'of whom' still referring to the same person as before, rather than to the pillar-arm itself.

After the apostrophe to Ganges-water above mentioned comes an acknowledgment of the authorship of the panegyric, and of the erection of the monument to his deceased master, by the *dewan* of the young prince (whom Dr. Mill conjectures with great plausibility to be Chandra Gupta II.):—and at a respectful distance the name of the officer by whom his orders were carried into execution; *avasthitamcha*, is the word employed, which from the obscurity of the copy before him Dr. Mill read *senánvitamcha*.

When I mention further that I find no invocation in lines 2, 3, on behalf of the sculptor and blackener of the letters, I have summed up all the changes, and I may venture to say amendments, which Captain Smith's facsimile has introduced in the *general bearing* of the document embraced in Dr. Mill's analysis, (page 261, vol. III.)

But this is by no means the extent of obligation due to it:—for although lines 13-37 remain as before, eulogistic descriptions of the king in the genitive case, the purport of the greater part is entirely altered; moreover by some unaccountable oversight in Lieut. Burt's transcript the last dozen letters of the 15th line are omitted altogether,

* I adhere to the former numbering of the lines for convenience of reference.

and in their place are brought up as many from the end of the following line; and this transposition continues until the 24th line, where it will be seen that the same dozen letters that close the 23rd line are repeated! It would indeed have been extraordinary, under such unfavorable conditions, had our learned vice-president been able to give a perfect translation! we may rather wonder that he could make any thing at all of such a mass of confusion!

When restored to its natural order we find the epithets applied to the deceased Emperor of Hindustan, not only much less hyperbolical and reposing less upon mythological allusions, but crowding in a short space a most unexpected and curious survey of the political divisions of India at the time, containing even the names and titles of very many of the reigning families, and extending beyond the boundaries of India proper into the regions of the "great king" of Persia and the hordes of the Huns and Scythians! It may be poverty of imagination in the poet that has wrought us this good; for once laying hold of an idea he rings the changes upon it as long as he can find words, and then draws up with an inelegant '&c.' Thus in the 14th and 15th lines he enumerates no less than nine warlike weapons the king's brawny arms were scarred in wielding: and thus when he mentions tributary states he fortunately spares none that SAMUDRA's supremacy could in any degree comprehend! The passage is altogether so curious that I must crave permission to insert a copy of it in the roman character before I endeavour to trace any of the countries alluded to. The continual recurrence of the adjectival termination *ka*, (the prototype of the modern genitive *postposition*) led me to suspect the nature of the sentence.

16. *Kausalaka mahendra, máhakántáraka vyaghra rája, Kaurádrika manṭa rája, arghásht̤apuraka mahendra, mirika-uddyaraka swámi, dattairaṇḍapallaka dáyana, kánchiyaka vishṇu, sápávamuktaka* (17.) *Nilarája.*

In this sentence we have the regal designations of nine princes; unless (which is probable enough) the terms *mahendra, rája, swámi, nila rája, dayana*, &c. are employed with the same general acceptation of prince, to vary the expression euphoniously.

The kingdom of *Kausala* (or *Kosala*) is well known from the Buddhist authors to be modern *Oude*, (Ayodhya)* or *Benares,—Kásikosala* of WILFORD. The *Vyaghra mukhas*, tiger-faced people, are mentioned in the *Varásanhita*, among the eastern countries; and *Cántára* a place south of *Allahabad*, but the name may apply to any woody tract

* WILFORD however makes *Kausala* the *delta or Sundarban* tract of Bengal. As. Res. IX. 260.

infested by tigers. The next name *Kaurádrika* is unknown, nor can the title *Manṭa rája* be well explained. It may be the district of *Curu*, near *Tahnesar*. *Argghashṭapuraka*, the next name, may be construed as the eight cities where due reverence was paid to brahmans:—*Mírika* and *uddyaraka* seem derivable from *míri* cream, and *uda* water, maritime countries;—*dattairaṇḍaka*, may be some country famous for producing the castor-oil plant;—*Kánchiyaka* may be *Kánchipur*, the golden city in the south mentioned in the *Brahmanda purána*;—*S'ápávamuktaka*, bears also an allegorical interpretation, 'freed from a curse;'—as likewise the rája's title *níla* 'the blue:'—can the *nílagíri* be his locality? it is one of the mountain divisions of *Jambudwipa* in the *Brahmanda purána* "like the lapis lazuli gem is the *Níla* mountain*." Thus it may be uncertain whether these are figurative or real names, though it is hardly to be supposed that countries purely imaginary would be introduced as subsidiary to the rule of a man just deceased. The list continues in the same strain:—

17. (*Nila rája,*) *vaingèyaka hastivarma, pálakka-ugrasena, devarashtraka kubera, kausthalapuraka dhananjaya, prabhriti sarva dakshinapatha rája griha samájánugraha janita pratáponmis'ra máhabhágyasya.*

All these names, it says, belong to that division of India entitled *Dakshinapatha*, the lowermost of the four equilateral triangles into which the *Mahábharat* divides ancient India—the *Dachinabades* of Arrian. This division, known to the contemporary of Alexander (Euemerus) was still extant in the time of Nonnus. *Vaingèyaka* is a regular derivative from *Vinga;* but neither this country nor *Pálak*, are to be found in the Pauranic lists of the southern countries, unless the latter be the country of the *Pallis*†. It must be remarked, that the names of their rulers are circumstantially given Hastivarma, and Ugrasena: and following them we have Kuvera and Dhananjaya of *Daivarashtra*, and *Kausthalapura*, places equally uncertain; though the former has some affinity to *Devagiri* or *Deogir; rashtra* implying merely 'country:' *Mahárashtra* might also be understood. *Kusasthallí* is said by Wilford to have been the name of *Oujein* in the *treta yuga*: Tod names the same place 'on the Indian ocean,' but the general interpretation is Canouj, a place out of the limits of the *Dakshinapatha*.

The enumeration continues in the 18th line, as follows:—

Rudradeva, Matila, Nágadatta, Chandravarma, Ganapati, Nága, Nágasena, Achyuta, Nandi, Balavarma,—adyaneka Aryavarta rája, &c. ending with *paricharakíkrita sarvadevarájasya.*

* Asiatic Researches, vol. VIII. Wilford's Essay on Geography, 345.

† Placed by Wilford in Candeish, and otherwise called *Abhiras*.—As. Res. VIII. 336.

Here we have the actual names of ten rájas of India Proper or *Aryavarta*, without their respective countries, as though they were too well known to need insertion. The first, *Rudra*, probably belongs to the *Sáh* dynasty of *Saurashtra*, where the name so often occurs: *Ganapati* is also a family name: but few or none of the others can be identified in the very imperfect lists of this early period.

In the following line we have a catalogue of provinces, whose kings were probably unknown by name to the writer.

19. *Samata, taḍuvakra, kámarúpa, nèpála, kartripura-adi pratyanta, nripatibhir malavárjunáyana, yaudheya, mádraka, abhira, prarjuna, sana kaṅka kákakhara parikádibhis cha; Sarva kara dánájnákarana pranámágamana* (20) *paritoshita prachaṇḍa sásanasya.*

The first five are the names of boundary mountain states on the north-east. The first two names cannot be determined, but the text does not permit Dr. Mill's plausible reading *Sumata dárachakra*, the country friendly to pines. *Kámarúpa*, and *Nepála* are well known: *Kartripura* may possibly be *Tripura* or *Tipperah*. Then follow those more to the north and west, most of which are to be found in the lists of the north-west countries extracted by Wilford from the Puránas, and published in As. Res. VIII. 340-343.

Malava he would make the modern *Málwa*, but this may be doubted as it is classed with *Mádraka*, *Yaudheya*, *Arjunáyana*, and *Rájanya* (? *Prárjuna*) as 'drinking the waters of the *Airávati* (Hydraotes),' and consequently in the Panjáb. *Mádraca* is placed near *Taxila* or *Takshasila*: *Yaudheya* or the country of Yuddha is very frequently mentioned in the Puránas, as lying between the *Betasta* (Hydaspes), and *Sindhu* (Indus). Wilford calls it Sinde Proper, the *Ayud* of travellers of the 16th century, and *Hud* of the book of Esther. It must not be confounded with *Ayodhya* or *Oude*: and it may be here remarked that the *Behat* group of Buddhist coins and sometimes Bactro-Pehleví legends on the reverse, having constantly the word *Yaudheya* on the margin in the old character, certainly belong to this kingdom.

The *Abhiras* are shepherd kings (or more probably hill tribes) in various parts of India; those here enumerated must be the *Abhiras* of the upper part of the Indus near *Attock*. *Abhisara* is often understood as *Cashmere*, the kingdom of *Abisares*, if we trust Wilford. The two final names *sana kaṅka* and *kákakhara* are unknown: the former reminds us forcibly of the *kanirka* of our coins; and the latter has some analogy to the *kaka bambas* of Gen. Court's map, to the north-west of *Cashmír*. *Kanaka* appears in Wilford's list as an impure tribe on the west border.

Passing over the panegyric about his restoring the descendants of long deposed kings, which however is a fact not to be slightly regarded in a historical point of view, we come to another very curious passage :

Daivaputra sháhi ; sháhánusháhi, saka, murunduih ; sainhádrika adibhis cha,—sarva dwípavásibhir, &c.

Here we have a picture of his foreign relations, the nations who used to send him presents, or tribute of jewels, coin, horses, fruit, and even their daughters ! First, *Daivaputra shâhi* (षाहि), ' the heaven-descended king :' this title would apply to the Parthian kings who are styled in the well known triple inscriptions, ΕΚΓΕΝΟΥΣ ΘΕΩΝ, and on the common Sassanian coins, " offspring of the divine race of gods." But the two first letters are slightly obliterated and might be read either *Dábha*, or *Dára-putra :* the latter, ' son of Darius' would still apply to the same parties, and this is confirmed by the next words षाहानषाहि in which we recognize the very Persian title شاهانشاه ' king of kings,' which prevailed to the extinction of the Sassanian dynasty in the seventh century, so that here at any rate we have a limit to the *modernicity* of our inscription. Of the *Sakas* so much has been said that it is not requisite to dwell long on them : they are the *Parthians* of Wilford's chronological table of Indian dynasties ; others identify them with the Sacæ, the *Scythians*, the *Sakya* tribe of Buddhist notoriety, and the *Vikramáditya* opponents who introduced the *Saka* era. The *Murundas*, according to Wilford*, are a branch of the Indo-Scythians who succeeded the Parthians, and in fact the same as the *Hunas* or *Huns*. Thirteen kings of this dynasty, he says, reigned in the northern parts of India. " They are the *Morundæ* of Ptolemy, who were masters of the country to the north of the *Ganges* from *Delhi* to *Gaur* and Bengal. They are declared in the Puránas to be *Mlechhas*, impure tribes, and of course they were foreigners. The same are called *Maryanthes* by Oppian in his Cynogetics, who says that the *Ganges* runs through their country."

Sainhádri, the country of the lion *Sinha*, might safely be identified with *Sinhala*, or *Ceylon :* especially as it is followed by *Sarva-dwipa*, ' all the isles,' which must refer to the *anca diva* of Wilford, (the Laccadives ?) called by Ptolemy the *Aigidiæ*† ; but I find a more plausible elucidation in Col. Sykes' memoir on the geology of the Dakhan, which informs us that *Sainhádri* is the proper name of the hilly range to which we give the appellation ' Western Ghâts.'

As a proud peroration to this formidable list of allies and tributaries, the poet winds up with the brief epithet words *prithivyám apratira-*

* As. Res. VIII. 113, and table. † As. Res. VIII. 186.

thasya, 'whom in his war-chariot none in the world can rival or withstand,' the very epithet found on one of the coins of SAMUDRAGUPTA, *(apratirathas)* which I at first read *apatirurha.* However much we may allow for exaggeration it will be granted that the sovereign to whom even a fair share of all this power and vast extent of empire could be attributed, must have exercised a more paramount authority in India Proper than most of its recorded kings. The seat of his own proper kingdom is unfortunately not mentioned, but I think it may be fairly deduced negatively from this very circumstance. *Magadha, Ujjayani,* and *Surasena* are omitted; these therefore in all probability were under his immediate rule, and I may appeal again to the frequency of his coins discovered at *Canouj* as a reason for still fixing his capital at that place; his family connection with the *Licchavís* of *Allahabad,* will account for the commemoration of his deeds at that many-roaded *(aneka márga)* focus.

Of what family were SAMUDRA and the preceding GUPTAS, is nowhere mentioned. Dr. MILL's claim to a *Suryavansa* descent for them however falls to the ground from the correction of the epithet *Ravibhuva,* sun-descended, which turns out to be only the verb *babhuva,* 'was.'

But I rather avoid being led into any disquisition upon this fruitful subject, since I agree in all that has been brought forward by the learned commentator on this and the *Bhittri* inscriptions in regard to the CHANDRAGUPTA of neither of them being the SANDRACOTTUS of MEGASTHENES. On the other hand I incline much to identify him with the prince whom the Chinese Buddhist travellers found reigning in the fifth century having a name signifying "cherished by the moon*."

It now remains to give my revised transcript of the inscription at length, along with a translation effected with the aid of my pandit KAMALÁKÁNTA by whom the *Devanágari* text was scrutinized and corrected in a few places, under second reference to the original, which is for the most part beautifully distinct. I have collected all the letters into an alphabet at the corner of the accompanying plate for the guidance of those who would consult the more ancient character. Every letter has been found in the most satisfactory manner; and the only precaution to be attended to in reading is as to the application of the vowel *á,* which occupies different places in different letters *as in the Silasthambha alphabet.* Thus, it is attached to the central stroke of the *j* upward; to the second foot of the ण *n,* downwards; to the ट *ṭ,* horizontally with a curve; to ब *b,* as a hook on the centre: and to other letters at top in the Tibetan fashion. A few examples are introduced in the plate below the alphabet.

* J. A. S. VI. 65.

2 यस्यक्रान्तेविषङ्गाचित सुखमनसःशास्त्र तस्वार्त्थेभोक्तुः..न..नोच्छ

3 (भर्त्त) व्यश्रीविरोधान्बधगुणितगुणज्ञाहतानेवकृत्वा
द्विर्लोके विश्वपातास्फट बहुकविताकीर्त्तिराज्यं भुनक्ति

4 तद्वाहत्युपगुह्यभावपिशुनैरुत्कर्षिनौरोमभिः
सभ्येषूच्छासितेषु (प्र) तुलकुलजमानाननोद्वी ...

5 स्नेहव्याभजितेनबास्य गुरुणा तत्वीक्षिणा चक्षुषा
यःपत्राभिहितो निविष्टनिखिल .....

6 दृष्ट्वाकर्म्माण्यनेकान्य नणुजसदृशान्यङ्कतोद्भिन्नहर्ष
भवैरास्राद्धयण .....

7 वीर्य्योत्तप्तश्च कं चिच्छरिणमुपगतोयस्य वृत्तेप्रणामे प्यति.....

8 सङ्ग्रामेषुस्वभुजविजितानित्यमुच्चप्रकाराः श्वश्वोमानप्र ....

9 गोप्तोत्तुङ्गैःस्फुटबहुरसस्नेहफुल्लैर्म्मनोभिः पश्चात्तापाव .....

10 उद्वेलोदितबाहुवीर्य्यरभसादिकेनायेनक्षत्रो
द्यान्मुत्पान्यांतनाणृसेषु .....

11 दण्डैर्ग्रईयतैर्वकोत कुलजंपुष्पन्धायक्रीडता

12 धर्मत्प्राचीरबन्धाः शशिकरशुचयः कीर्त्तयःसंप्रताना
वैस्यतुषभद प्रग्रमेर....मुर्द्ध .....

13 सव्याजःसूक्तमार्ग्गः कविमतिविभवोत्सारणंचपकाश्य
कोनुस्याद्योस्य नस्य... .....

14 तस्य विविधसमरशतावतरणदक्षस्य स्वभुजबलपराक्रमैकबन्धोः
पराक्रमाङ्कस्यपरशु शङ्कुशृनि प्राशासि तोमर

15 वत्सपाल नाराच वैतस्तिकाद्यनेकप्रहरण विरूढाकुल व्रणशताङ्क
शोभा समुदयोपचित कान्ततर वर्ष्मणः

16 कौसलक महेन्द्र महाकान्तारकव्याघ्रराज कौराट्टकमण्टराजार्ग्घा
ष्टपुरकमहेन्द्र मीरिकौद्यारक स्वामि दत्तैरण्डपल्ल कदयनका
ञ्चेयक विष्णु शापावमुक्तक

17 नीलराज वैङ्गेयक हस्तिवर्म्म पालक्ककोग्रसेन देवराष्ट्रक कुबेर

कौशलपुरक धनञ्जय प्रभृति सर्व्वदक्षिणापथ राज ग्रहसमा
जानुग्रह जनित प्रतापोन्मिश्र महाभाग्यस्य

18 रुद्रदेव मतिल नागदत्त चन्द्रवर्म्म गणपति नाग नागसेना च्युत
नन्दि बलवर्म्माद्यनेकार्य्यवर्त्तराज प्रसभोद्धरणोद्वृत्त प्रभाव
महतः परिचारकीकृत सर्व्वदेवकराजस्य

19 समतटाडवक्र कामरूप नेपाल कर्त्तृपुरादि प्रत्यन्त नृपतिभिर्म्मा
लवार्जुनायन यौधेय माद्रकाभीर प्रार्जुन सनकानीक काकखर
परिकादिभिश्च सर्व्वकरदानाज्ञाकरणप्रणामागमन

20 परितोषित प्रचण्डशासनस्य अनेकभग्नराज्योत्पन्नराजवंशप्रतिष्ठा
पनोद्गतातिवेल भजनोपार्जितयशसः दैवपुत्रषाहि षाहानषा
हि शक मुरुण्डैः सैंहाटकादिभिश्च

21 सर्व्वद्वीपवासिभिरात्मनिवेदन कन्योपायन दान गरुत्म दङ्काख
विषयभुक्ति शासन कांचनाद्युपायसेवाकृत बाऊवीर्य्यप्रसरध
रणिबन्धस्य पृथिव्यामप्रतिरथस्य

22 सुचरितशतालङ्कृतानेकगुणगणासक्तिभिश्चरणतलप्रमृष्टान्यनरपति
कीर्त्तेः साद्भसाभ्युदयप्रलयहेतुपुरुषस्याचिन्त्यस्य भक्त्य वनतिमात्र
ग्राह्यमदुद्दृदयस्यानुकम्पावर्त्यानेकशःशतसहस्र प्रजयितः

23 कृपणदीनानाथातुरजाङ्गनेरणामन्तदीक्षप्रियगानसिद्धस्य विग्रहा
वताडकानुग्रहस्य धनदवरुणेन्द्रान्तकसमस्य स्वभुजबऊविजिता
नेक नरपति विभवप्रत्यर्प्पण नित्यवाक्यतायुक्तपुरुषस्य

24 निश्चितविदग्धमतिक गान्धर्व्वललित व्रीडित चिदशपति गुरुतुम्बुरु
नारदादेर्व्विद्वज्जनोपजीव्यानेक काव्यक्रियाभिः प्रतिष्ठित कवि
राजशब्दस्य सुचिरानुभूतध्यानेकाद्भुतोदार चरितस्य

25 कान्तसमयक्रियानुविधानमात्रमानसस्य लोकधाम्नो देवस्य महा
राज श्रीगुप्तप्रपौत्रस्य महाराज श्रीघटोत्कचपौत्रस्य महाराजा
धिराज श्रीचन्द्रगुप्तपुत्रस्य

26 लिच्छविदौहित्रस्य महादेव्यां कुमारदेव्यामुत्पन्नस्य महाराजाधि

राज श्रीसमुद्रगुप्तस्य सर्व्वपृथिवीविजयजनितोदय व्याप्तनिखि
लावनितलाकीर्त्तिमितस्त्रिदशपति

27 भवनगमनावाप्तललितसुखविचरणमात्रागाः बभूव वाऊरयमु
च्छ्रितःस्तम्भः यस्य प्रदानभुजविक्रमप्रश्नमशास्त्रवाक्योदययोरुप
र्य्युपरिसञ्चयोच्छ्रितमनेकमार्ग्गयशः

28 पुनातु भुवनत्रयं यशुपतेर्जटान्तर्गृहानिरोधपुरिमोत्तशीग्रमिव
गाङ्गशाङ्कंपयः ॥ एतच्च काव्यमेषामेव भट्टारकपादानां दासस्य
समीपपरिसर्पणानुग्रहोन्मीलित मतेः

29 खाट्टपाकिकस्य महादण्डनायक ध्रुवभूतिपुत्रस्य सान्धिविग्रहिक
कुमारामात्यम (ह्यात्र) क हरिसेनस्य सर्व्वभूतहित सुखायास्तु

30 अवस्थितंच परमभट्टारकपादानुध्यातेन महादण्डनायक तिल
भट्टेन

Translation.

[Beginning with the *fifth* line, with *yasya* which has reference to a preceding eulogistic epithet in the genitive case. This is numbered verse 2 in Dr. Mitra's translation.]

2.....In the midst of pleasurable things happy in body and mind; levying his revenue in strict conformity with the shástras*.....

3.....Destroying unhappiness, and putting an end to those who cause it; greedy for eulogistic praise, glory and extended rule:—

4.....Whose enemies amazed at his cavalcade and warlike armament ask what manner of man is this?—Among his elevated counsellors.....

5.....Whose eyes filled with the tears of affection, when in consequence of his written mandate (his son or wife had been recalled?)

6.....Having seen his former good acts, delightful as nectar, his wife was much pleased.....

7. Inflamed with vigorous wrath against the presumptuous, but when submissive.....

8. In battles with his own arm humbling continually those who exalt themselves.....

9. Cherishing (his subjects) with an affectionate, sweet, and contented disposition.....

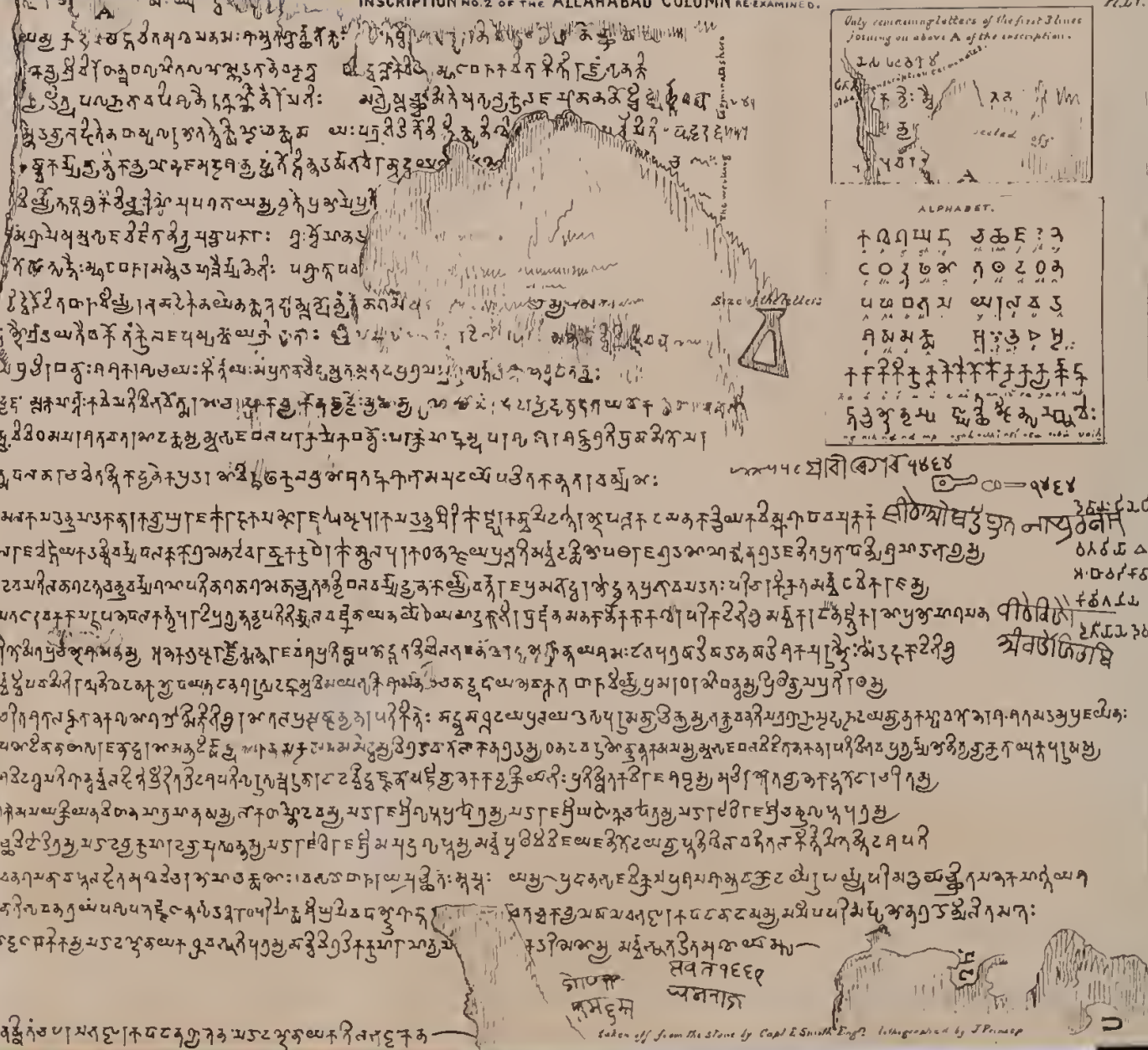
10....The force of his arm being gradually strengthened by youthful exercise, by himself were killed.....

11. [This verse is too much effaced to be made out.]

12. Whose fame is spread (over the earth), as it were a cloth white as the moon-beam.....

* Which enjoin that one-sixth of the produce of the land belongs to the king.

INSCRIPTION No. 2 OF THE ALLAHABAD COLUMN RE-EXAMINED.



13....The lustre of his skill in well-directed learning (causes exclamations) ' Who is there that is not his ?' (he is a fortress) and they are as it were grass upon his ramparts, and much wealth is locked up within him.

14. Of him, who is able to engage in a hundred different battles, whose own arm's strength is his only ally: he with the mighty chest...

15. Whose person is become beautiful from the marks of wounds received, and the scratches caused by his wielding the battle-axe, the arrow, the poniard, the elephant spike, the cestus, the scymitar, the javelin, the club, the iron dart, the dagger* and other weapons:—

16. The sovereign of *Kausala*, the tiger-king of the forests, the *manṭa* rája of *Kaurádri*, the sovereign of *Arghástapura*, the lords of *Míri* and *Uddyára*, the just prince of *Dattairanda*, the *Nila Rája* of *Sápávamukta*†.

17. The king Hastivarma of *Vinga*, Ugrasena of *Pálak*, Kuvera of *Devarashtra*, Dhananjaya of *Kausthalapura*, &c. and all the kings of the southern roads *(dakshinapatha)*:—from his favors to all these (I say) becoming more dignified and prosperous.

18. Whose power increases by the force or clemency respectively exercised towards Rudra Deva, Matila, Nagadatta, Chandravarma, Ganapati, Naga, Nagasena, Achyuta, Nandi, Ballavarma, and the other rájas of *Aryavarta*:—who has made serving-men of all the *Deva-rájas*:—

19. The magnitude of whose authority takes pleasure in exacting attendance, obedience and tribute from the kings of the neighbouring hilly countries of *Samata, Taravakra, Kámarúpa, Népála, Kartripura*, and from all the rájas of *Malava Arjunáyana, Yaudheya, Mádraka, Abhira, Prárjuna, Sanakánika*, (or *Sanaka Aníka,*) and *Kákakhara*.

20. Who is famous for his great aid in restoring (to their thrones) the royal progeny of many deposed rájas.

21. Whose most powerful dominion over the world is manifest in the maidens freely offered as presents, the jewels, the money, the horses, the produce of the soil, the ornaments of the precious metals brought as tribute by the heaven-descended monarch, the *Sháhán Sháhi* (of Persia), the Scythians, the Huns, by him of *Sainhádri*, and of other places; by the kings of all the isles, &c.:—who mounted on his war chariot has no competitor in the world.

22. Whose majesty exults in the princes endowed with hundreds of virtues and good qualities prostrate at his feet:—a man inspiring fear as of instant annihilation:—altogether incomprehensible;—yet tender-minded to those who are submissive and bow before him; and extending mercy to hundreds of thousands whom he has subdued:—

23. Who lends a willing ear, and a consoling tongue to the case of the poor and destitute, the orphan, and the sick:—is very kind to the brave of

* *Parashu, Shara, Shanku, Srini, Prása, Asi, Tomara, Vatsapála, Nuracha, Vaitasti*, &c. I have translated them as described to me, rather than on dictionary authority, for in Wilson, Nos. 2, 3, 4, 5, and 9 are all given as varieties of arrows; *vatsapála*, and *vaitasti*, I do not find, the latter is probably derived from *vaitasa* a ratan.

† A country lately freed from a curse,—perhaps some physical calamity.

his army, is comparable to Dhanada (Kuvera), Varuna, Indra, and Antaka (Yama*).

24. Who has won and again restored the riches of many kings conquered by his own right hand :—a man who strictly keeps his word, whose accomplishments in fashion, in singing and playing, put to shame the lord of the immortals (Indra), Vrihaspati, Tumburu, Na'rada, &c. Who is called 'the king of poets' from his skill in making verses—the livelihood of the learned!—whose excellent conduct proceeds from the observations stored in his retentive memory.

25. Who regularly performs all the established ordinances :—who is a very god among men :—the great-grandson of *Mahárája Srí* Gupta ; the grandson of *Mahárája Srí* Ghatôt Kacha ; the son of *Mahárája Adhirája Srí* Chandra Gupta.

26. Born of *Mahádeví* Kuma'ra Devi, the daughter of Lichavi ; *Mahárája Adhirája Srí* Samudra Gupta :—how he filled while alive the whole earth with the fame of his conquests, and is now departed to enjoy the supreme bliss and emancipation of Indra's heaven, this lofty pillar which is as it were his arm, speaks forth :—a standing memorial to spread his fame in many directions :—erected with the materials accumulated through the strength of the arm of his liberality, (now in repose,) and the sufficiency of the holy texts.

(Verse.) The clear water of Gangá that issues from the artificial pool formed by the encircled hair of the lord of men (Siva) purifies the three worlds.

May this poetical composition of the slave of the feet of the great king, whose mind is enlightened by the great favor of admission to the presence, son of the administrator of punishments (magistrate) Dhruva Bhuti,—the skilled in war and peace, the counsellor of the young prince, the great minister Hari Sena, afford gratification and benefit to all creatures!

Executed by the slave of the feet of the supreme sovereign the criminal magistrate Tilabhatta.

VIII.—*Interpretation of the Ahom extract, published as Plate IV. of the January number of the present volume. By Major* F. Jenkins, *Commissioner in Assam.* (See page 18.)

At the time of publishing the extract alluded to in the heading of this article, from a manuscript volume in the extinct language of *Assam*, presented to us by Mr. Brown, we expressed a hope that ere the volume was complete we should be favored with an interpretation of its meaning through the studies of some of our friends in that thriving valley. Major Jenkins has stepped forward at the eleventh hour to save our credit, having at length as he writes "obtained it through

* Gods of the earth, water, air and fire respectively.

the studies of our *Saddar A'mín* Juggorám Khargaria Phokan, who was however in the first instance obliged to send a copy of the plate to *Jorhát*. It has led him to the study of the *Ahom* language, and perhaps hereafter we may get from him some additional translations."

The text is given by Major Jenkins in the *Ahomí* and in the Roman character word for word with Juggorám's translation; but as we have no type, and as we find upon close comparison that the lithographed version has but one or two discrepancies in the nasals and vowels which will easily be discovered on comparison by the professed student, we must content ourselves with giving the romanized version with the verbal analysis to enable the reader to understand the spirit of this nearly monosyllabic language, and to compare it with other eastern dialects. Each *páda* is marked as in Sanskrit verse by a double line easily distinguished from the letters themselves.

1. *Pin-nāng jimmu-rānak teo-fā pāimi-ḍin,* ||
2. *Fāimi-lep-din múng-sú-teo,* ||
3. *Lāi-tyān kúp-kúp māi-tim-múng te-jao,* ||
4. *Tāṇkā khrang-fā freu-paimi nāng-hit-tyáo.* ||
5. *Khāk-khāi then-jin-kún,* ||
6. *Kang-ta ai-múi dāi-ai-nyā tejāo,* ||
7. *Khāṇta jéu-kāo lak-pin-fā,* ||
8. *Na-ring ba-tyú-múng ti-pan tejāo,* ||
9. *Tan-lau ju-mu pay-ju bān,* ||
10. *Fā-ka tak-lā ru-mí-khāi,* ||
11. *Bau-rufri-deo fān-mān heo-pān-ḍāi,* ||
12. *Khen-klang-rao nāng-freng,* ||
13. *Pu-vān tāng-kā mung-rām.* ||
14. *Freu-pai nang-hit-bang,* ||
15. *Kang-ta jeù-kān lak-pin-fā,* ||
16. *Kan-frā-fak rang-múng,* ||
17. *Lai-lep ti-pún tejāo,* ||
18. *Khān-ta mān-pay jin-pin-fā,* ||
19. *Ring-lúp mún-khām kai-leng pin-mun-khai,* ||
20. *Fā-pin fe-an-din,* ||
21. *Klem-klem-ak cheng-ngāo,* ||
22. *Khen-klāng-rāo nang-freng.* ||

Translation.

1. Formerly there was neither heaven nor earth but a mass of confusion.
2. There was neither island nor land in the globe.
3. Trees and grass in wild confusion overspread the land.

4. There was no lord over the heavens.
5. There was no human being but the earth was empty.
6. Frosts and frogs formed the food of the forests.
7. God, having transformed himself created the heavens as a spider spins her web.
8. The earth was a thousand *beons* thick.
9. God then rested for a few days.
10. God said, let BRAHMA be created.
11. I know not what deity or genius gave BRAHMA to us but him we received.
12. That same BRAHMA been resting on the sky as a honeycomb.
13. On this account all the world was a chaos.
14. There was no umbrella-bearing king on the earth.
15. God in the same manner as a spider, created the heavens.
16. The mount *meru* (or the white rock) supports the earth.
17. It also supports the numerous islands.
18. He after the model (he had taken) created the earth.
19. From one BRAHMA resembling a gilded egg, have proceeded many BRAHMAS.
20. That God who at first created the earth now pervades it.
21. The light that proceeded from the BRAHMA shone with brilliancy, splendour, and glory.
22. God rested on the sky as a honeycomb.

Verbal analysis.

1. *Pin-náng* (written *pinang* in the plate) to be—like that; *jimmu-rának*, formerly or first beginning,—deserted or confused, chaos, *eráká; Teo-fá*, to bottom—heaven: *páimi-din*, nonentity (is not)—earth.

2. *Páimi*, is not; *lep-din*, an island—land or globe; *múng-sa-teo*, country—to wish—below or under.

3. *Lái-tyán*, many-fold: *kúp-kúp*, layer-layer: *mái-tim-múng*, trees—to be filled—country; *tejao*, end, a complete, all.

4. *Tánká*, all or whole; *krang-fá* frost—sky; *freu-páimi*, anything—non-existence; *náng-hit-tyáo*, of sitting—of doing—master.

5. *Khák-khái*, division of divisions; *then-jin-kún*, jungle—calm or quiet निशुब्ध.

6. *Kang-ta*, to bring or keep (a thing) into subjection; *ai-mui*, frost—fogs; *dái-ai-nya*, to get—hope—forest; *te-jao* complete.

7. *Khán-ta*, word—only: *jeu-kao*, thread or fibre—of a spider; *lák-pin-fá*, having transformed—become—heaven.

8. *Ná-ring*, thick—thousand; *bá-tyú-mung*, beon (a measure of length containing four cubits) yojan—four kroshas—country: *ti-pún*, place—of world; *tejáo*, whole or complete.

9. *Tan-lan*, of that—afterwards; *ju-mu*, having remained—some days; *payu-bán*, again or secondly—having remained—days (of a week), वासर.

10. *Fa-ka*, god—again; *ták-bá*, having considered—said; *ru-mi-khái*, knowing—to become—Brahma (god).

11. *Bau-ru*, I know not; *fri-deo*, god—genius: *fán-mán*, ordered—to the Brahma: *heo-pán-dai*, gave—we received.

12. *Khen-klang-rao*, to remain থাকাকি, in the middle মধ্যে, in the air, without a prop বিরালম্ব: *náng-freng*, like what—like a honeycomb.

13. *Pu-van*, for this reason—and *tang-ka*, whole—all; *mung-rám*, country—*eraka* or desert or void confused.

14. *Freu-pái*, anybody—is not or existed not; *náng-hit-bang*, to be seated—doer—umbrella-bearing;

15. *Kang-ta*, to govern or keep in subjection—only; *jeú-kán*, fibre—spider; *lak pin-fá*, having transformed—became—heaven or sky.

16. *Han-fra-fak*, one—stone or rock—white: *rang-mung* upholden—country or land.

17. *Lai-lep*, many—islands; *ti-pún* places—of world; *tejáo*, all—and

18. *Khan-ta*, by word—only; *mán-pay*, he—again; *jin-pin-fá*, pattern—became—heaven.

19. *Ring-lúp*, thousand—gilding; *mún-khám*, Brahma—like gold; *kai-leng*, only—yellow; *pin-mung-khai*, become—Brahma—like egg, ডিম্ববৎ.

20. *Fa-pin*, god—became; *fe-an-din*, having pervaded—first—earth, ভূডিম্ব?

21. *Klem-klem-ak*, alone with brightness—came forth; *cheng-ngáo*, rays—glorious.

22. *Khen-kláng-ráo*, remained—in the middle—in the sky; *nang-freng*, how? like honeycomb.

Major Jenkins subjoins from the institutes of Menu, two passages which seem to have been the original whence the *Ahomese* (*Assamese*) version of the creation of the world was drawn. We have added the translation of Sir William Jones.

आसीदिदन्तमो भूतमप्रज्ञात मलक्षगम।
अप्रतर्क्यम विज्ञेयम्प्रसूप्रमिव सर्व्वतः। ५।

5. This *universe* existed only in the first *divine idea yet unexpanded, as if involved* in darkness, imperceptible, undefinable, undiscoverable *by reason, and* undiscovered *by revelation*, as if it were wholly immersed in sleep:

तदण्डंमभवद्धैमं सहस्रांशुसमप्रभम्।
तस्मिन्जज्ञे स्वयंब्रह्मा सर्व्वलोक पितामहः। ६।

6. That *seed* became an egg bright as gold, blazing like the luminary with a thousand beams; and in that egg he was born himself, *in the form of* Brahma, the great forefather of all spirits.

The allusion to the earth and sky in the last two lines may probably be better interpreted from the 12th and 13th verses of Menu.

तस्मिन्नण्डे सभगवानुषित्वा परिवत्सरम्।
स्वयमेवात्मनोध्यानात्तदण्डमकरोद्द्विधा। १२।
ताभ्यांस शकलाभ्याञ्च दिवम्भूमिञ्च निर्म्ममे।
मध्येव्योम दिशश्चाष्टावपांस्थानञ्च शाश्वतम। १३।

12. In that egg the great power sat inactive a whole year *of the creator*, at the close of which by his thought alone he caused the egg to divide itself:

13. And from its two divisions he framed the heaven *above* and the earth *beneath*, in the midst *he placed* the subtil ether, the eight regions, and the permanent receptacle of waters.

Sir WILLIAM JONES, considered it indubitable that the Hindu doctrine of the creation was in part borrowed from the opening of *Birásít* or *Genesis*, 'the sublimity of which is considerably diminished by the Indian paraphrase of it with which MENU, the son of BRAHMÁ, begins his address to the sages who consulted him on the formation of the universe.' The Assamese seem to have gone a step further, in expanding and adulterating the tradition with the introduction of the fresh metaphors of a spider's web and a honeycomb: the latter, we suppose, representing the fixed firmament or dome spangled with lights.

While thanking Major JENKINS, and the zealous band of *American* missionaries, of whose studies and researches he often speaks in flattering terms, we must remind him that we still lack a translation of the *Khamti* passage, published in January. Will not Mr. BROWN yet save our volume from closing without it?—ED.

IX.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 6th December, 1837.

WILLIAM CRACROFT, Esq. C. S. in the chair.

Mr. JOSEPH WILLIS, Dr. COLIN JAMES MACDONALD, Major A. IRVINE, and Captain H. DRUMMOND, proposed at the last meeting, were ballotted for, and duly elected members of the Society.

Nawáb JABAR KHAN, proposed at the last meeting, was upon the favorable Report of the Committee of Papers elected an honorary member.

J. H. BATTEN, Esq. proposed by the Secretary, seconded by Mr. MCLEOD.

Bábu CONOV LA'L TAGORE, proposed by ditto, seconded by Mr. HARE.

CHARLES ELLIOT BARWELL, Esq. proposed by Mr. CRACROFT, seconded by the Secretary.

Maulavi ABDUL MOJID requested the loan of the *Harishamín* and the *Suwádíq Mahriqa* to collate with an edition he is now printing.

He also made an offer of 1000 rupees for the broken series of the *Fatawa Alemgirí*, undertaking to reprint the first two volumes at his own expence:—referred to the Committee of Papers.

Read a letter from Dr. MCCLELLAND, accepting a seat in the Committee appointed at the last meeting for the superintendence of the Museum.

Bábu RAMDHAN SEN announced that he had completed the second volume of the *Ináya*, and in compliance with his agreement presented 50 copies of the work to the Society for distribution at their discretion.

Letters from the President of the Geographical Society of Paris, M. ROUX DE ROCHELLE, and from the Baron MACGUCKIN DE SLANE, forwarded their publications (see 'Library').

The following extract from the BARON DE SLANE's letter will interest oriental scholars:

"Sachant combien vous vous interessez, Monsieur le Président, au progrès de la culture des langues orientales, je profite de cette occasion pour vous informer que la premiére livraison du texte Arabe de la geographie d' Aboulfeda sera

publiée dans peu de jours; l'impression de cette ouvrage, (qui a été confié par la Societé Asiatique de Paris à mes soins et à ceux de mon savant collègue Monsieur Reinaud de l' Institut,) s' avance rapidement, et nous éspérons pouvoir bientôt en offrir un exemplaire à votre Société."

Library.

The following Books were presented by Lieut.-Colonel Sykes, through Captain Henning of the Ship *Windsor*.

Remarks on the origin of the popular belief in the Upas, or poison tree of *Java*, by Lieut.-Colonel W. H. Sykes, F. R. S.

Descriptions of new species of Indian Ants.

Land Tenures of Dukhun.

Abstract of the statistics of Dukhun, 1827-28.

On the increase of wealth and expenditure in the various classes of Society in the United Kingdom as indicated by the returns made to the tax office, exports and imports, savings banks, &c. &c.

On the Geology of a portion of Dukhun, East Indies.

The following by the authors and editors respectively:

Le Diwan d'Amro'lkaïs précédé de la vie de ce poete par l'auteur du Kitab el Aghani accompagné d'une traduction et de Notes par le Baron MacGuckin de Slane, 1837—*by the author.*

Bulletin de la Société De Geographie, Vol. 6th—*by the Society.*

Recueil de voyages et de memoires publié par la Soc. Geog. &c. Paris, Vol. I. containing Geographie d'Edrisi traduite de l'Arabe en Français par P. Ame'de'e Jaubert, Vol. I.—*by the same.*

Les Oeuvres de Wali, translated with notes, by M. Garçin de Tassy.

Manuel del'auditeur du Coursd' Hindoustani ou Themes Gradués—*by ditto.*

Die Stupa's oder die architektonischeu Deukmale an der grofsen Konigsstrasse swischen Indien, Persien aud Baktrien. Von C. Ritter—*by the author.*

Also various brochures, being extracts from the great works of the same author on the Physical Geography of Asia:—

"Der Ju (Yu) Stein, ju-chi der chinesen:—Der elephant indicus:—Weber Berbreitung der Pfefferrebe, banane und mango in Indien:—Der indische Feigenbaum, asvattha:—Ueber den tope von Manikyala:—Das Lowen and Tiger-land in Asiien; and die Opium cultur.

Transactions of the Geological Society of London, Vol. 4th, part 2nd, and their proceedings from No. 47 to 50 inclusive, with a list of its members—*by the Society.*

Bell's Comparative View of the external commerce of Bengal during the years 1835-36 and 1836-37—*by the author.*

Madras Journal of Literature and Science, Oct. by Dr. Cole, the Editor.

Vivâda-chintamani,—edited and presented by Jogdhan Pandit, Sanskrit College.

Meteorological Journal for 1837—*by the Surveyor General.*

Received from the Booksellers:

Lardner's Cabinet Cyclopedia—Statesmen, Vol. III.

————————————Swainsou's birds, Vol. II.

Wellesley's dispatches, Vol. IV.

The secretary laid on the table a catalogue of the Arabic, Persian, Turkish and Hindu works in the Society's library, prepared by the Society's maulavi and printed in Persian for general circulation.

Antiquities.

Major P. L. Pew wrote from Delhi that at his solicitation, Mahárája Hindu Rao had handsomely presented the ancient pillar, lately lying in Colonel Fraser's grounds, to the Asiatic Society.

Major Pew stated that the fragment containing the inscription was the largest of the whole, and that its weight was very considerable so as to render it difficult to remove it from its present situation for transmission to Calcutta. It was suggested that as the shaft was already broken, and the written part considerably mutilated it would answer the Society's object to cut off the portion contaiuing the inscription, which would thus be reduced to portable dimensions.

Resolved, that thanks be given to Mahárája Hindu Rao for this liberal gift, as well as to Major Pew, for his kind exertions on behalf of the So-

ciety; and that a letter be addressed to Government, on the strength of the permission lately accorded, requesting that the executive engineer of the *Delhi* division may be authorized to effect the conveyance of the pillar to Calcutta at the public expence.

With reference to the same pillar, Mr. T. METCALFE, C. S. forwarded a copy, made by hand with every care, of the inscription.

Major PRW's impression has anticipated this work; and it is curious to remark the errors committed by the eye in copying even the more perfect passages of the inscription.

Bábu CONOY LA'L TAGORE, begged the Society's acceptance of the *Beldl Sena* copper-plate he sent for inspection at the last meeting.

Lieutenant KITTOE forwarded a facsimile of the ancient inscription on the *Khandyiri* rock, of which an imperfect copy is given in STIRLING's Report on *Cuttack*.

Lieutenant KITTOE had seized the first moment to run out by dâk to the spot, a distance of 40 miles, in order to effect this object. He was obliged to construct a scaffolding to get at the writing, and the transcription was continued even by torch-light; being much worn, it was found that the morning and evening shadows allowed the fairest chance of restoring the doubtful letters.

The result of this spirited undertaking has been to bring to light a very curious document, entirely different from those hitherto read, in the lát character. It is of a somewhat later date, and there are already several modifications of the alphabetical forms.

Colonel SYKES, Member of the Royal Asiatic Society, transmitted from London, copies of a few of the inscriptions on the caves of the Dakhan which he had collected long since, and had presented to the Branch Society of Bombay.

He had remarked on them, many of the Buddhist symbols noted on the early Indian coins, and he was in hopes the inscriptions if deciphered might throw some light upon them. The Secretary was happy to state that he had read the whole of them at once, and they presented another valuable link in the chain of the primitive alphabet, which would materially aid the labours of the Rev. Mr. WILSON, Mr. WATHEN, and Dr. STEPHENSON, on the west of India.

Dr. A. BURNS communicated copy of another copper-plate grant from *Kaira* in *Gujerat*.

This plate on being deciphered, has also led to a discovery, the value of the numerals corresponding with the alphabets of the third century, hitherto a desideratum. It is applicable to the inscription at Bhilsa, and to several documents published lately without explanation of the numerical signs.

Captain EDWARD SMITH, Engineers, forwarded impressions on cloth and paper, of the whole of the inscriptions on the *Allahabad* pillar.

The mode of executing this difficult task, and the utility of it towards the correction of the highly curious historical details disclosed, were described in a note by the Secretary, (printed in the present number.) The cloth impression, suspended from the ceiling of one side of the meeting room, spread over several chairs, after touching the ground! Capt. SMITH states that the chief difficulty of the undertaking lay in the pillar not being perfectly straight, which prevented its readily turning or rolling over.

Captain SMITH had submitted to the Military Board, several improved designs for the pedestal and capital of the pillar, adopting the Buddhist *Sinha* for the surmounting ornament.

Captain F. JENKINS communicated a translation and analysis of the *Ahom* fragment published in the January No. of the Journal, made by JAGGORAM KHARGARYA PHOKAN, Sadar Amín of *Gohati*.

Major OUSELEY forwarded from *Hoshangabad* the sketch of a *Jain* image in possession of a *Khandalwál banya*, with Prákrit inscription of 300 years old.

Lieut. MADDEN also sent from *Nímach*, copies of inscriptions on various Jain images dug up in that neighbourhood.

General VENTURA, Honorary Member, submitted for inspection some Bactrian coins, and Hindu antiques from the *Panjáb*.

Among the coins, besides a number of *Apollodotus* and *Menander*, silver, were a small silver *Lysias*, a copper coin of *Heliocles*, unique; new varieties of *Mayes* and *Azes*, and a *Kosula Kadaphes*. Among the *intaglios* in cornelian and garnet, a female head with inscription *Kesava dasasya*, another of *Ajita varma*, and others. Also a Buddhist seal of black pottery, bearing the *ye dharma* formula.

The General also sent for exhibition a series of drawings of the costumes of the Panjáb, and a portrait of RANJIT SINGH, by Mr. VIGNE.

Lieut. C. B. YOUNG, Engineers, presented some Egyptian antiquities, mummied alligators, &c.

H. WALTERS, Esq. gave, in the name of Captain BOGLE, a set of Arracanese griffin weights.

His Royal Highness Prince HENRY of *Orange* entrusted to the Secretary for exhibition, a bronze vessel formed of a cup soldered to a dish, containing, thus hermetically closed, a small quantity of water.

This vessel was found in an old temple at *Java*; local tradition stated it to contain *Ganges* water carried thither in times of yore by some pious pilgrim.

Physical.

The reply of Lieut. HUTTON was received, accepting the Society's commission to explore the *Spiti* valley should he be able to obtain leave of absence.

H. R. H. Prince HENRY of *Orange*, sent three heads of the wild bull of *Java* (*Tandoe Banding*) for comparison with the *Gaur* of India.

Dr. EVANS pointed out remarkable specific differences in the forehead and position of the horns of the two animals.

Mr. H. M. PARKER, forwarded in the name of Mr. TREVOR PLOWDEN, of *Meerut*, a large slab of the peculiar flexible sandstone, described in a note from Dr. FALCONER, some meetings since.

A thinner slice of the same material sent by General Sir DAVID XIMENES shewed its properties in a very striking manner. On examination with the blowpipe and with acids the cement which unites the particles of sand proves to be silicious, but in very small quantity. The stone is easily friable, and bends to a small extent only when it seems checked as with a hinge. The motion is in any direction, and is made with very slight force.

Specimens of salt from the Persian Gulf in large cubical crystals, of copper ore, and of the mineral used in dyeing the red slippers of *Bussorah* (red ochreous lithomarge?) were presented by the Hon. Colonel MORISON.

Lieut. YOUNG presented gypsum and other minerals from Egypt, collected in his journey to India. Lieut NESBITT also added samples of the coal and iron ore (a rich carbonate) from Syria, lately mined by the Engineers in the service of the Pacha.

Lieut. H. SIDDONS, in compliance with the Society's request, forwarded a register of the tides on the *Chittagong* coast for October.

Dr. MCCLELLAND placed on record a descriptive catalogue of the series of Geological specimens collected by himself while employed with the late Assam deputation, and now deposited in the museum.

Lieut. EYRE presented in the name of Dr. LANGSTAFF a collection of specimens of the volcanic rocks of Bourbon and Mauritius, with a descriptive catalogue and notes.

The tables were covered with a portion of Dr. EVANS' fine collection of objects of natural history—birds, animals, reptiles, insects, shells, and osteological, which the proprietor tendered to the Society for purchase on virtue of the late communication from Government; but the meeting was so thinly attended that it was decided to postpone the discussion of Dr. EVANS' proposition.

A note from Colonel MAC LEOD, Chief Engineer, acquainted the Society with the progress of the experimental boring in the Fort.

The tubes had reached a depth of 450 feet, and had met with some impediment to their further descent; though the sand continued to enter below. A rolled fragment of vesicular basalt had been brought up from this depth.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of November, 1837.

Day of the Month.	Observations at 10 A. M.							Calculated Humidity.			Observations at 4 P. M.							Calculated Humidity.			Register Thermometer extremes.		Rain.		Wind.		Weather.	
	Old Stand. Barometer at 32°.	New Stand. Barometer reduced.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew-point.	Hair Hygrometer.	Centesimal tension of vapour by wet-bulb.	Do. by hair Hygrom.	Ditto by dew-point.	Old Stand. Barometer at 32°.	New Standard Barometer.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew-point.	Hair Hygrometer.	Centesimal tension of vapour by wet-bulb.	Do. by hair Hygrom.	Ditto by dew-point.	Cold on roof.	Heat in sun's rays on roof.	On the ground.	At elevation 45 feet.	10 A. M.	4 P. M.	Forenoon.	Afternoon.
1	29,986	29,834	78,7	6,5	5,4	69,6	83	70	74	75	29,761	29,708	82,8	13,2	10,6	66,6	76	45	52	57	66,0				WSW	N. W.	fine.	cumuli fine.
2	,889	,849	79,3	7,6	6,6	68,9	86	65	70	71	,787	,743	82,7	11,2	9,1	67,0	79	54	57	60	65,6				N. W.	WNW.	do. cirri.	hazy.
3	,920	,880	79,5	9,9	9,0	64,0	82	56	63	61	,833	,776	83,9	12,3	10,2	66,1	77	50	54	57	68,7				N. E.	N. E.	do.	cir. cumuli.
4	,913	,876	79,1	7,5	6,0	67,2	87	66	72	68	,829	,781	80,6	10,1	8,6	63,5	81	55	61	58					N. W.	N. E.	hazy.	cloudy.
5	,897	,860	76,5	6,5	4,8	68,5	90	69	78	76	,810	,741	78,7	7,7	6,5	65,0	82	65	63	65					N.	N.	overcast.	overcast.
6	,844	,815	78,2	5,8	5,0	67,5	89	72	76	70	,768	,716	81,2	10,8	8,2	65,0	81	53	61	64					N.	N.	cumuli.	fair.
7		,884	77,2	8,8	7,2	63,0	83	59	65	64	,724	,760	80,5	12,0	10,0	62,5	75	47	51	56					N.	N.	cirri.	clear.
8	,935				7,6						,739	,741	81,0	11,9	9,7	63,5	77	50	54	56						N. W.	—	do.
9	,901	,864	77,3	8,9	7,6	60,5	83	59	65	58	,800	,753	80,9	11,5	9,0	63,0	77	51	54	53	65,0				N. W.	N. W.	cumuli fine.	do. fine.
10	,919	,886	76,7	7,6	6,7	66,0	85	65	68	72	,782	,733	81,6	12,0	9,7	62,7	73	48	56	56					N. W.	N.	clear.	do
11	,898	,869	78,9	8,9	7,2	64,4	83	60	65	62															NNW		do.	—
12	,900	,863	79,3	9,1	7,4	64,5	83	59	65	61	,810	,744	82,0	10,8	9,0	63,5	80	55	59	53					N.	N.	do	do
13	,930	,878	78,8	8,8	7,4	64,0	83	60	65	62	,842	,778	82,0	10,3	9,1	63,0	78	56	56	53					N.	N.	do	do
14	,925	,884	78,3	8,9	8,5	62,0	80	60	59	59	,837	,783	81,8	11,6	9,5	61,4	76	51	52	54					N.	N.	do	do
15	,910	,873	77,2	9,0	8,0	63,1	83	58	65	64	,802	,751	80,5	12,8	12,0	60,5	74	46	49	53	62,0				N.	N.	do	do
16	,896	,861	75,8	6,3	6,3	62,2	84	70	66	64	,802	,753	82,0	14,6	14,0	59,6	69	40	42	46	57,8				S.	N.	do	do
17	,948	,920	75,4	10,1	9,5	58,6	76	52	52	57	,877	,835	81,2	14,3	12,0	58,7	70	37	44	49	61,7				N. W.	W.	do	do
18	30,010	,971	77,4	8,9	9,5	62,0	82	59	63	61	,887	,839	81,5	12,9	10,1	61,0	75	45	51	54	64,0				WS.W.	W.	do	do
19	29,954	,937	77,8	7,8	6,5	63,8	85	65	68	63	,890	,850	81,8	11,6	10,2	62,4	79	51	57	56	65,2				WNW.	S.	do	do
20	,987	,952	77,5	6,5	5,5	66,0	88	70	74	70	,862	,816	82,5	10,8	8,4	64,6	80	55	59	55	65,4				WNW.	N. W.	do	do
21	,960	,925	79,0	7,3	6,0	62,5	87	67	72	58	,876	,823	82,3	11,6	8,7	65,3	78	51	56	56	65,0				WNW.	N. W.	do	do
22	,986	,951	78,8	10,1		59,2	80	55	59	54	,892	,844	82,6	13,1	10,3	63,7	74	45	49	53	63,2				N. E.	N. E.	do	do
23	,980	,947	76,8	10,2	8,8	60,0	79	52	57	57	,875	,826	81,7	14,0	11,0	60,5	71	42	45	53	58,1				E.	ws.w.	do	do
24	,998	,938	73,0	7,3	6,9	59,4	83	64	65	64	,898	,854	79,9	18,2	15,5	54,5	60	25	31	43	57,0				WNW.	N. W.	do	do
25	,968	,990	72,2	9,8	9,0	58,2	78	51	56	60	,888	,847	79,1	15,4	14,9	57,5	61	35	33	48	56,5				N. W.	N. W.	do	do
26	,938	,936	72,7	11,2	10,0	53,0	73	45	48	52	,845	,793	78,0	17,2	14,3	52,0	62	27	34	43	55,4					N. W.	do	do
27	,935	,913	71,7	10,6	9,3	53,2	75	47	51	54	,829	,784	77,3	15,7	12,9	53,6	66	32	38	45	57,5				W.	N. W.	do	do
28	,970	,927	73,7	12,1	10,0		75	42	51		,878	,827	76,9	14,9	12,3	53,5	69	35	42	45	57,5				N.	N. W.	do	do
29	30,019	30,001	71,9	8,6	8,0	55,4	81	57	61	57	,940	,898	77,2	15,1	12,0	52,8	67	33	40	44	59,0				N. W.	N. W.	do	do
30	,019	29,992	72,1	7,1	5,7	55,6	87	66	72	57	,896	,854	77,5	12,2	11,0	53,0	72	45	46	45	60,1				WNW.	N. W.	do	do
Mean.	29,939	29,907	76,5	8,5	7,4	62,1	82	60	64	62	29,864	29,791	80,7	12,7	10,6	60,9	73	45	49	52	61,5							Clear and fine.

For the last two months proper attention has not been paid to the distinctions of force in the column of wind. The mornings and evenings have been generally calm, and the breezes light during the forenoon.

98°
100
102°
22°
20°
18°
Moung Lem
Esmok or Moung La
Kiu lun Kiang
M. Meng
Hing
M. Vang
Kiang Toung
Kiang Hung
Nam Kha
Me Lem
M. Hai
M. Hum
M. Ham
M. Kha
M. La
M. Pang
M. Lou
M. Pok
Ta lau
M. Ma
M. Lue
M. Tu
Kiang Khaing
Supposed Route of the Chinese Caravan
M. Kan
Baula
To Ava
M. Ka
Kiang Tung
M. Niong
M. Ku
Kiang Kieng
Phang
M. La
M. Pieng
Lem
Tum
M. Pan
M. Pok
Ban
M. Panlak
M. Hat
Moung U
M. Ung
Hai Tai
Me Khong
Kiang Tsen
M. Ling
M. Tsat
M. Pa
Me Khok
M. Khok
Kiang Hai
Me Lai
Kiang Kheng
Chinese Caravan
Bawong
M. Quat
Pak Bong
The Cambodia River or Me Khong
M. Hing
M. Pai
Fue Bai
M. Tsumat
M. Khing
Me Ping
Mien Longyee R.
Zimme
Labong
Me Sa
Me Kuan
Ban Pasan
Ban Don
Ban Hun
Ban Sony
Nong Long
Mien Longyee
Ban Pe
Moung Nan
Lagon
Moung Haut
Me Niun or Mien Longyee R.
The Salwin
Moung Phe
Moung Li
Moung Tuan
Moung Loung Phaban
Mc Leods Route to Zimme
Me Ping
From Zimme
Ban Phit
Yembain
Thoung Yin
Mc Leods Route
Me Wang
Coagain
Me Niun
Me Nan
Martaban
Gain R.
Lahaing
Maulamyaing
Amherst Pag.
Ataran R.
Haundrau R.
M. Ram Peng
98°
100
102°

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